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DISEASES CAUSED BY BACTERIA AND FUNGI

GALE, E. F., & RODWELL, A. W. (1948.) **Amino acid metabolism of penicillin-resistant staphylococci.**—*J. Bact.* **55.** 161–167. [Authors' summary copied *verbatim.*] **2034**

The amino acid metabolism of two organisms rendered resistant to high levels of penicillin has been compared with that of the penicillin-sensitive parent strains (*Staphylococcus aureus*). The resistant organisms do not differ markedly from the parent strains in their ability to oxidize amino acids, but they do differ in that they have no power to concentrate free glutamic acid in the internal environment and are able to synthesize all their amino acid requirements from ammonia and glucose in the presence of thiamine.

BELLAMY, W. D., & KLIMEK, J. W. (1948.) **Some properties of penicillin-resistant staphylococci.**—*J. Bact.* **55.** 153–160. [Authors' summary copied *verbatim.*] **2035**

Variants of *Staphylococcus aureus* resistant to 1 to 4 mg of penicillin per ml retain this resistance after 60 serial transfers in the presence of these concentrations of penicillin. Fifty-four subsequent serial transfers through broth in the absence of penicillin did not decrease the resistance. The variant has lost the ability to produce acid from lactose, sucrose, maltose, mannitol, and galactose. It will not grow in the presence of 6·5 per cent sodium chloride nor will it reduce nitrates. It has gained the ability to synthesize enough nicotinic acid for growth. It produces an extracellular penicillinase when grown in the presence of penicillin.

Serial transfers through a medium consisting of glucose, salts, nicotinic acid, thiamine, and 0·05 per cent yeast extract will cause a reversion from gram-negative rods to the original gram-positive staphylococcus forms. The reverted staphylococci have lost most of their resistance to penicillin.

ROUNTREE, P. M. (1949.) **The phenomenon of lysogenicity in staphylococci.**—*J. gen. Microbiol.* **3.** 153–163. [Author's summary copied *verbatim.*] **2036**

Of thirty coagulase-positive staphylococci, twenty-seven proved to be lysogenic. Free phage was found in filtrates of 4–5 hr. broth cultures of the lysogenic strains. The phages from six of these strains were examined by estimation of the amounts occurring in filtrates, for serology and for their range of lytic reactions with indicator strains. A number of strains were found which carried as many as five distinct bacteriophages. Probable phage mutations were also demonstrated. Interference effects due to lysogenicity were not a marked feature of the strains investigated.

It is assumed that the free phage released by the lysogenic strains is responsible for infection of sensitive indicator strains. The approximate proportion of lysogenic cells capable of releasing phage has been determined for three strains; it varied for the three strains and according to the indicator strains used, ranging from 1/3 cells inoculated to 1/30,000 cells inoculated. The mechanism of the release is probably due to multiplication of the phage in a number of lysogenic cells with consequent lysis of the cells and release of the phage.

Lysogenicity appeared to be a permanent feature of these strains. Every cell was apparently carrying phage and treatment with heat, with specific antibacteriophage serum, or by growth in broth containing sodium citrate did not make the cells non-lysogenic. For such strains, apart from an extracellular release of phage from a few cells in each culture, there is postulated an intracellular transference of phage to each daughter cell at cell division.

CORNEJO, P. M. (1948.) Contribucion al estudio de la botriomicosis. Un caso de "botriomicosis" de la lengua en un caballo. Estudio bacteriológico e inmunológico del botriococo aislado. **[Botryomycosis in horses.]**—*Rev. grancolomb. Zootec. Hig. Med. vet.* **2.** 5–15. **2037**

C. describes a case of botryomycosis in the tongue of a horse, characterized by swelling and ulceration, and profuse salivation. The condition was treated successfully by penicillin and sulphathiazole, followed by two courses of autovaccina-

tion. The bacterium isolated from the lesion was studied in detail and was found to differ from *Staph. aureus* in several respects, which, C. believes, justify its classification as a "botriococcus".—I. W. JENNINGS.

PACKER, R. A. (1948.) **Penicillin therapy in chronic bovine mastitis. I. Sensitivity of bovine mastitis organisms to the action of penicillin.**—*Amer. J. vet. Res.* **9.** 140–143. **2038**

Of 456 strains of organisms associated with bovine mastitis 16 strains only of *Staph. aureus* were found to be naturally resistant to penicillin, but no resistant strains were found among strains of *Str. agalactiae*, *Str. dysgalactiae* or *Str. uberis*. There was no sensitivity to penicillin after treatment in any of the organisms.—J. I. TAYLOR.

NIVEN, C. F., Jr., WASHBURN, M. R., & WHITE, J. C. (1948.) **Nutrition of *Streptococcus bovis*.**—*J. Bact.* **55.** 601–606. [Authors' summary copied *verbatim*.] **2039**

The nutritive requirements of certain strains of *Streptococcus bovis* have been determined. These organisms were found to be unique among the streptococci in the simplicity of these requirements.

A majority of the strains tested have an absolute requirement for only one vitamin, biotin, whereas thiamine stimulates growth appreciably. Nicotinic acid and pantothenic acid slightly stimulate the growth of most strains. However, to obtain maximum growth and serial transfer in a synthetic medium, it was necessary to add all four of these vitamins.

No single amino acid is indispensable to the growth of *Streptococcus bovis*. Each strain tested, except one, could be subcultured in a medium containing arginine and glutamic acid as the only amino acids present.

An inorganic source of sulfur in the form of sodium sulfide fulfills the sulfur requirements of this organism.

No difference was found in the nutritive requirements of the bovine strains and the strains obtained from human cases of subacute bacterial endocarditis, though slight strain differences were detected in the cultures of each group.

SHATTOCK, P. M. F. (1948.) **Serological position of *Streptococcus bovis*. [Correspondence.]**—*Nature, Lond.* **161.** 318. **2040**

Specific sera from Group D were produced from strains of *Str. bovis*, while, by improved methods of extraction, these strains were precipitated with a Group D serum. Reciprocal absorptions with both types of sera confirm that *Str. bovis* is a member of Group D.—J. I. TAYLOR.

SHATTOCK, P. M. F. (1949.) **The streptococci of group D; the serological grouping of *Streptococcus bovis* and observations on serologically refractory group D strains.**—*J. gen. Microbiol.* **3.** 80–92. [Author's summary copied *verbatim*.] **2041**

The concentration of the group-specific substance in hydrochloric acid extracts by precipitation with ethanol has facilitated the serological identification of *Streptococcus bovis* and certain other serologically refractory streptococci as members of group D. The notorious difficulty of preparing potent group sera for *Str. bovis* was overcome by immunizing rabbits with organisms shaken with an abrasive in a magnetic vibrating machine. The relationship of *Str. bovis* to certain other streptococci and the chemical nature of the specific substance of group D are discussed.

LAUGHTON, N. (1948.) **Canine beta haemolytic streptococci.**—*J. Path. Bact.* **60.** 471–476. [Author's summary copied *verbatim*.] **2042**

One-hundred-and-thirty canine strains of beta haemolytic streptococci were investigated culturally and serologically; 58 were examined biochemically. The streptococci were isolated from cases of presumed streptococcal infection and their contacts and from normal dogs in kennels where there had been no infection.

The prevalence of beta haemolytic streptococci among dogs was confirmed by their isolation from 70 per cent. of healthy dogs in uninfected kennels. Among these strains 39 of 44 belonged to group M, and it is suggested that these are of no pathological significance. The strains within this group were found to belong to at least two serological types of agglutinin-absorption tests.

The strains isolated from clinical cases of disease and from a small number of contact carriers belonged to groups G and L, 54 strains being in group G and 12 in group L.

It is considered that, in view of the prevalence of beta haemolytic streptococci in dogs generally, grouping is an important prelude to effective prophylaxis and therapy in canine streptococcal infections.

—. (1947.) **Studies on streptococcal fibrinolysis. V. The in vitro production of fibrinolysin by various groups and types of beta hemolytic streptococci; relationship to antifibrinolysin production. [By the Commission on acute respiratory diseases.]**—*J. exp. Med.* **85.** 441–457. [Summary copied *verbatim*.] **2043**

A method for the measurement of fibrinolysin production by beta hemolytic streptococci is described. The test was shown to be highly accurate in that repeated determinations showed only small variations. A study of 766 strains of beta hemolytic streptococci isolated from normal soldiers and patients with respiratory disease

showed that fibrinolysin was produced by Lancefield groups A, C, and G, and, in addition, by a few strains of groups B and F.

Group A streptococci produced more fibrinolysin on the average than the other groups. The median titers were 117 for group A, 61 for group C, and 20 for group G streptococci. In a study of 388 typed group A streptococci from different subjects the fibrinolytic capacity of an organism was shown to be related to the serological type. The importance of this observation in relation to the rôle of streptococcal fibrinolysis in infections is discussed.

Finally, it was demonstrated that strains of streptococci which produced large amounts of fibrinolysin were capable of stimulating antifibrinolysin formation in patients whereas strains that produced small amounts only occasionally caused antibody formation.

TODD, E. W. (1947.) **A study of the inhibition of streptococcal proteinase by sera of normal and immune animals and of patients infected with group A hemolytic streptococci.**—*J. exp. Med.* **85.** 591–606. [Author's summary copied *verbatim.*] **2044**

Antiproteinase sera were prepared by immunizing horses with filtrates from a selected strain of group A streptococcus. This strain, which produced high titred proteinase but no erythrogenic toxin, was selected from forty-two strains of group A streptococci which produced varying amounts of proteinase. A few strains belonging to groups B, C, and G were also tested; they were all proteinase-negative. Methods are described for titrating streptococcal proteinase in crude culture filtrates and for measuring the antiproteinase activity of serum. The antiproteinase titres of sera from immunized horses ranged from 125 units to 1,000 units per cc. in contrast to the low titres of normal horse sera, only 5 per cent of which had titres as high as 10 to 30 units per cc.

The available evidence suggests that the antiproteinase activity of immune sera is dependent on the action of specific antibody for streptococcal proteinase. Patients infected with group A streptococci do not develop high antiproteinase titres. There appears to be no correlation between the occurrence of rheumatic fever and the antiproteinase titre of the patient's serum.

MCCARTY, M. (1948.) **The occurrence of nucleases in culture filtrates of Group A hemolytic streptococci.**—*J. exp. Med.* **88.** 181–188. [Author's summary copied *verbatim.*] **2045**

All of the thirty-six strains of group A hemolytic streptococci tested were found to elaborate ribonuclease and desoxyribonuclease during growth in liquid cultures. Both enzymes are released into the medium.

Desoxyribonuclease is consistently produced in greater amount than ribonuclease. The concentration of desoxyribonuclease in the culture increases logarithmically during active growth of the organisms.

Under the conditions employed, the presence of specific substrate or enzymatic split products of the substrate did not influence the production of either nuclease.

The failure of viscous desoxyribonucleic acid to serve as a source of the purine growth factor required by certain strains of group A streptococci was shown not to be referable to the inability of these strains to form desoxyribonuclease.

The determination of nuclease activity provides another criterion for evaluating purification procedures used in the attempted isolation of substances such as streptokinase and proteinase from the supernates of streptococcal cultures.

ROTHBARD, S., & TODD, E. W. (1948.) **Production of proteinase by hemolytic streptococci in various clinical conditions.**—*J. exp. Med.* **87.** 283–294. [Authors' summary copied *verbatim.*] **2046**

The proteinase activity of strains of group A streptococci isolated from patients in acute and convalescent phases of illness was found to be remarkably constant. Sulfadiazine therapy of patients did not affect proteinase production by the infecting streptococci.

The ability to produce streptococcal proteinase would appear to be related to the strain and not necessarily to the serological type.

No relationship could be found between the capacity of group A streptococci of different serological types to produce proteinase and the various clinical responses to infection with these microorganisms.

FOLEY, G. E. (1947.) **Further observations on the occurrence of streptococci of groups other than A in human infection.**—*New Engl. J. Med.* **237.** 809–811. [Abst. in *Bull. Hyg., Lond.* **23.** 358. (1948), copied *verbatim.* Signed: R. E. O. WILLIAMS.] **2047**

Streptococci isolated from 118 cases of infection of sites other than respiratory tract were examined for Lancefield Group. The most numerous sources were subacute bacterial endocarditis (34 cases), abscess and peritonitis (17), urinary infection (16), septicaemia (13), septic wounds (11) and empyema (11). Group A strains were isolated from 23 patients (20 per cent.), strains of Group B, C–G, D, E, F, or K from 77 (65 per cent.), and α-haemolytic streptococci that failed to react with any of the sera A to M, from

18 (15 per cent.). Fourteen of the last group were from cases of subacute endocarditis. Group D strains were the most common, being isolated from 15 of the 16 patients with urinary infection and from 19 of the 34 with endocarditis. Six of the unclassified endocarditis strains resembled the *Str. s.b.e.* [subacute bacterial endocarditis] of NIVEN *et al.* Strains of Groups other than A were not always β-haemolytic on horse blood agar: the authors observed α- and β-haemolytic strains of Groups B and E, α- and non-haemolytic strains of Groups F and K, and α-, β-, and non-haemolytic strains of Group D. In all, only 25 per cent. of the 82 strains of Groups A—K were β-haemolytic.

BERNHEIMER, A. W., & RODHART, M. (1948.) **The effect of nucleic acid and carbohydrates on the formation of streptolysin.**—*J. exp. Med.* **88.** 149–168. [Authors' summary copied *verbatim.*] **2048**

Ribonucleic acid of yeast causes the formation of a potent hemolysin in broth cultures of *Streptococcus pyogenes.* The hemolysin whose formation is induced by yeast ribonucleic acid appears to be identical with streptolysin S. Desoxyribonucleic acid, products of acid or alkaline hydrolysis of ribonucleic acid, or many other substances tested, fail to produce a similar effect. Digestion by ribonuclease increases markedly the streptolysin-inducing activity of certain preparations of ribonucleic acid.

A fraction (AF) of yeast nucleic acid has been isolated which possesses approximately 100 times the streptolysin-inducing capacity of the starting material. Some of the properties which distinguish AF, a polynucleotide, from ordinary yeast nucleic acid are described. AF is associated with the ribonuclease-resistant fraction of yeast nucleic acid. Ribonucleic acid prepared from streptococci, wheat germ, and mammalian liver, and subsequently treated with ribonuclease, is about as active in causing streptolysin formation as ribonuclease-treated yeast nucleic acid. Ribonucleic acid of tobacco mosaic virus, tested under comparable conditions, was found to be inactive. Ribonucleic acid prepared from streptococci, wheat germ, and tobacco mosaic virus resembles yeast nucleic acid in possessing a ribonuclease-resistant fraction.

In addition to AF, a factor (or factors), present in meat infusion and in peptone, was found to be required for the formation of streptolysin. The factor can be partially replaced by any one of several carbohydrates, the most active being maltose, glucosamine, and trahalose, in that order. When appropriate concentrations of AF, maltose, and glucose are used, the nucleic acid-induced streptolysin can be produced in a medium whose chemical composition is essentially defined.

SMOLENS, J., & CHARNEY, J. (1947.) **The antigenicity of crystalline lysozyme.**—*J. Bact.* **54.** 101–107. [Authors' summary copied *verbatim.*] **2049**

Crystalline lysozyme prepared from egg white is antigenic. It combines with specific rabbit antisera to high titer. Antilysozyme rabbit serum inhibits the activity of lysozyme on *Micrococcus lysodeikticus.*

VISWANATHAN, G. R., & AYYAR, S. V. (1946.) **Subacute anthrax in cattle in Madras.**—*Indian J. vet. Sci.* **16.** 232–234. **2050**

An outbreak of anthrax involving about 32 cattle with 24 deaths within a period of 12 days was checked after the use of spore vaccine. Novarsenobillon (neo-arsphenamine) given in the early stages was said to have some effect.

—V. R. RAJAGOPALAN.

NAGARAJAN, E. R. (1948.) **A note on the type of tubercle bacilli responsible for tuberculosis in cattle of the Madras Corporation.**—*Indian Vet. J.* **25.** 152–156. **2051**

N. found that, in five cattle affected with TB., culture and small animal inoculation tests indicated that the bacilli were of bovine type in each instance.—V. R. RAJAGOPALAN.

WASZ-HÖCKERT, O. (1947.) **On the period of incubation in tuberculosis.**—*Ann. Med. Intern. Fenniae.* **36.** 764–772. [Abst. in *Bull. Hyg., Lond.* **23.** 487. (1948), copied *verbatim.* Signed: D. D. REID.] **2052**

The recent resurgence of interest in BCG gives point to this short paper on the incubation period in tuberculosis. Full histories are given of a series of cases where the incubation period from exposure to onset of symptoms could be precisely determined. The conventions followed were those laid down by WALLGREN. (1) That the possibility of previous infection before the stated date of exposure must be eliminated by Mantoux tuberculin test; (2) An allergy change after exposure must also be eliminated; (3) The diagnosis of the cases acting as the source of infection must be confirmed; (4) The time of exposure must not exceed 14 days.

A comparison of the distribution of the incubation period in these ten cases was found not to differ statistically from the experience observed in 46 similar cases drawn from the literature, and statistical analysis of the amalgamated data from both these sources suggested that the period of incubation in tuberculosis lay between 34 and 40 days with a mean of 37·1 days. On the basis of samples of the size investigated (46), it is estimated that in only one case in one

hundred would the incubation period be more than 58 or less than 16 days. Counting roughly in weeks, it appears from the experience of the cases so far reported, that the incubation period generally lies between 4 and 6 weeks with an average of rather more than five weeks.

BLOCH, H. (1948.) **The relationship between phagocytic cells and human tubercle bacilli.** —*Amer. Rev. Tuberc.* **58.** 662–670. [Spanish summary. English summary copied *verbatim.*] **2053**

A study has been made of the comparative effects on phagocytic cells in the peritoneal exudate of mice of a virulent culture (H37Rv) and an avirulent variant (H37Ra) of the same strain of human tubercle bacilli.

Both virulent and avirulent bacilli were taken up at the same rate by polymorphonuclear cells during the initial stage of the infection. Extracellular bacilli could still be seen several hours after injection, however, in the peritoneal exudate of animals which received the virulent bacilli, whereas avirulent bacilli could be found only in the intracellular phase.

The observed facts suggest that the virulent bacilli (but not the avirulent variants) can exert on the polymorphonuclear cells which have phagocyted them a lytic effect which results in the release of the bacilli into the extracellular fluid.

DUBOS, R. J. (1948.) **Cellular structures and functions concerned in parasitism.**—*Bact. Rev.* **12.** 173–194. **2054**

The immunochemical approach to the study of infectious processes, after the pattern laid down by Avery and his school, is applied to the study of tuberculosis. Those facts concerning the different constituents of the parasitic cell which appear to affect its virulence, and the host reactions to these weapons, are discussed.

The tubercle bacillus is characterized by its wide range from non-pathogenic varieties to those of extreme virulence, by the well-defined host specificity of its types and the marked variations in the virulence of strains arising from a single organism. Virulent and avirulent strains inoculated into the peritoneal cavity of a mouse are phagocytosed equally readily. The avirulent organisms may survive for a long time in the cells but never multiply, whereas the virulent strains multiply very rapidly and are soon found inside and outside the cells. It is possible that their multiplication may be favoured by products of the disintegration of phagocytic cells since it has recently been shown that engulfment of virulent organisms often results in the death and disruption of the phagocyte.

Morphologically the virulent organisms are characterized by a tendency to grow in thick strands resulting from adherence of cells in the long axis. This tendency can be overcome by surface active agents and is therefore probably due to the production of a hydrophobe substance by the virulent organism. It is possible that there is some correlation between this substance and the cytotoxic substance also produced by the virulent organisms. As has been shown with pneumococcal polysaccharide and the M substance of streptococci, a substance may be present in quantities insufficient to endow an organism with virulence but nevertheless sufficient to provide an antigenic stimulus. In this way the attenuated BCG strain may not contain sufficient serpentine growth substance to make it grow in strands, yet sufficient to be an antigenic stimulus for antibodies protective against a virulent organism.

The most marked of the host reactions to infection by the tubercle bacillus is the allergic reaction. Many fractions of the organism are responsible for allergic reactions besides the bacillary protein which induces the delayed or tuberculin type, and the host response does not vary with virulence of the fractionated organism. It is not possible therefore to correlate the capacity to induce the allergic state with virulence.

The tubercle bacillus is known to enhance the antigenicity of other unrelated substances. Its presence in infection may induce immune reactions to certain normal tissue components of the infected host. It is also possible that tubercle bacilli are capable of rendering certain surface active esters antigenic after absorption on to the organism so that antibodies are produced against such haptenic substances as phospholipoids and cerebrosides.

The possibility of factors in the host which react back on the pathogen is considered. Certain antigens may be produced only *in vivo* and the efficiency of BCG vaccination might result from its ability for limited proliferation in the tissues. Equal protection can, however, be established with a vaccine of heat-killed virulent bacilli. Nevertheless, non-virulent organisms, growing in oleic acid-albumin media, can be induced to grow in the serpentine virulent fashion by the addition of aqueous chick embryo extract. The characteristic is exaggerated if the same technique is applied to virulent organisms. It is completely reversible on return to ordinary media.

Apart from immune reactions, many metabolic phenomena of the host may affect the pathogenicity of the organism. Lipoids play an important part in the metabolism of the tubercle bacillus, certain long chain fatty acids being very markedly stimulating to respiration and multiplication. Certain tissue components, such as

sphingomyelin, behave likewise. And, in general, any physiological substance which has the effect of stimulating respiration, increasing yield, encouraging the growth of small inocula and reducing generation time will favour the establishment of the disease. The beneficial effects on the growth of the organism when lysed cellular elements are added to an otherwise poor serum medium may be paralleled *in vivo* by the caseous and necrotic material which is present in silicosis, forming a suitable nidus for tuberculous infection. The cytotoxic property of the virulent bacillus on phagocytes may benefit it in this way.

Tissues also contain substances other than immune bodies which are bacteriostatic or bactericidal. Certain long chain fatty acids are known to be toxic for the tubercle bacillus and in autolysing tissue the detoxifying effect of serum albumin and sphingomyelin, normally present, may be inhibited. All surface active substances increase the susceptibility of the organism to antibacterial agents by virtue of their power of facilitating dispersed growth of the organism.

—A. M. Blomfield.

Paraf, J., Desbordes, J., German, A., & Henry, G. (1947.) Intérêt pronostic de la mesure de l'enzyme lipolytique du sérum au cours de la tuberculose. **[The estimation of the lipolytic enzyme of serum in the course of tuberculosis and its value in prognosis.]**—*Ann. biol. Clin.* **5.** 258–261. [Abst. in *Bull. Hyg., Lond.* **23.** 765. (1948), copied *verbatim.* Signed: B. Stocker.] **2055**

The authors describe a modified technique for measuring the lipase activity of human serum, and state that in cases of tuberculosis they have found an inverse relationship between the level of the serum lipase thus determined, and the degree of activity of the disease.

Paraf, J., Desbordes, J., & Buu-Hoi. (1947.) Notions nouvelles sur le rôle des lipides dans l'infection tuberculeuse et ses relations avec le laboratoire. Etude d'antigènes synthétiques. **[New ideas on the role of lipoids in tuberculous infection, and their relation with the laboratory. Study of synthetic antigens.]**—*Ann. biol. Clin.* **5.** 245–257. [Abst. in *Bull. Hyg., Lond.* **23.** 765. (1948), copied *verbatim.* Signed: B. Stocker.] **2056**

Anderson isolated from tubercle bacilli phthioic acid, a branched-chain fatty acid which on injection gave rise to tubercle-like lesions, and Robinson suggested that all such fatty acids of α trisubstituted acetic acid type might have similar properties. One of the authors, with other collaborators, has synthesized such fatty acids, and this article gives preliminary results of the investigation of these products as complement-fixing antigens, and in tests for skin sensitivity.

The fatty acid used in complement-fixation tests was $CH_2 : CH.(CH_2)_9 . C(CH_3)_2 . COOH$. Oleic acid was used as control antigen. With some but not all of the sera from tuberculous patients tested, the synthetic antigen fixed complement. In no case was complement fixed by the control (straight-chain) fatty acid, nor did the branched-chain acid fix complement with any of the control normal sera tested.

Various synthetic products were tested in parallel with tuberculin 1 in 1,000 for ability to produce skin reactions, doses of 0·5 mgm. in olive oil being injected intradermally in a number of tuberculous patients. Six branched-chain fatty acids tested all produced erythema, papules and oedema after a latent period of about 2 days in tuberculin-sensitive patients, while seven branched-chain homologues in which the fatty acid group had been replaced by another active group, and five straight-chain fatty acids, produced only slight transient erythema.

The ability of these synthetic branched-chain fatty acids to act as complete antigens has not yet been determined.

Spendlove, G. A., Cummings, M. M., Fackler, W. B., Jr., & Michael, M., Jr. (1948.) **Enhancement of growth of a strain of *M. tuberculosis* (var. *hominis*) by streptomycin.**—*Publ. Hlth Rep., Wash.* **63.** 1177–1179. [Authors' summary copied *verbatim.*] **2057**

A strain of *Mycobacterium tuberculosis*, growth of which is markedly enhanced by the presence of streptomycin in the culture medium, has been isolated from the sputum of a patient who had received this antibiotic for treatment of pulmonary tuberculosis. The patient's infection exhibited rapid progression during the course of streptomycin therapy.

Ratcliffe, H. L., & Wells, W. F. (1948.) **Tuberculosis of rabbits induced by droplet nuclei infection. I. Initial response to infection. II. Response to reinfection.**—*J. exp. Med.* **87.** 575–584; & 585–594. [Authors' summaries and conclusions copied *verbatim.*] **2058**

I. Rabbits were caused to inhale known numbers of virulent bovine tubercle bacilli as separated cells in droplet nuclei. For approximately 5 weeks after infection the growth of the bacilli and the response of rabbits to their growth was homogenous; *i.e.*, all reacted in the same way and to the same degree. After 6 weeks individual differences in the rate of progress of the initial tubercles and of the infection as a whole became evident. These variations in the response seemed to be influenced by the number of initial

tubercles and by the number of bacilli found in the lesions.

It is concluded that, as evidenced by the homogenous phase of infection, rabbits do not differ in their resistance to initial growth of bovine tubercle bacilli. However, the later, heterogenous pattern of response suggests that these animals vary widely in their capacity to acquire resistance.

II. At intervals from 2 to 11 weeks after normal rabbits had inhaled small numbers of virulent bovine tubercle bacilli as separated cells in droplet nuclei, groups of these animals received a single exposure to reinfection during which each animal inhaled about 20,000 separated bacilli.

Normal control rabbits which inhaled this large number of bacilli died within 4 weeks thereafter. Their deaths were attributed to destruction of the lungs by developing initial tubercles.

Eleven of 12 rabbits which were reinfected within 4 weeks after initial infection seemed to respond as normal animals. Their lungs were largely replaced by developing reinfection tubercles when they died or were killed within 32 days after reinfection.

The inflammatory response of the reinfection tubercles was not consistently different from that of initial tubercles, although reinfection tubercles contained fewer bacilli than initial lesions of the same age.

Within 5 weeks after initial infection rabbits apparently had developed immunity to reinfection with virulent bovine tubercle bacilli inhaled as separated cells in droplet nuclei. In some of them, however, exposure to massive inhaled reinfection seemed to stimulate the progress of initial infection. It is suggested that in rabbits the development of resistance to tubercle bacilli does not bear a linear relationship to time, but progresses in steps and within 5 weeks after small initial infection by inhalation is adequate to prevent the growth of separated bacilli when these are deposited upon alveolar walls. It is suggested also that the basic effect of acquired resistance of rabbits to tubercle bacilli is inhibition of multiplication of the bacilli.

GIROUX, M. (1947.) Tuberculose experimentale du hamster doré. **[Experimental tuberculosis in the golden hamster.]**—*Laval med.*, **12.** 863. [Abst. from abst. in *Amer. Rev. Tuberc.* **58.** No. 5. p. 36 of absts. (1948).] **2059**

The author tested the value of the golden or Syrian hamster, *Cricetus auratus*, for work with the tubercle bacillus. The three animals of a first group, weighing about 110 g. each, were given subcutaneous injections of 0·1 mg. of a strain of human type tubercle bacilli of average virulence. Infection proceeded very slowly and generalized TB. developed only after three months. A second group of five was inoculated with 0·5 mg. of a virulent culture of a strain which had been used previously in experiments with g. pigs and rabbits. The animals were killed after intervals varying from 15 days to four months. TB. developed slowly in this group also. The third group, of five animals, was inoculated with 0·5 mg. of a strain of bovine type tubercle bacilli. In these animals there was a more rapid development of TB. The author concludes that the Syrian hamster is not as useful for animal inoculation with TB. as the g. pig, but that it might be employed with advantage in differentiating the human and bovine types of the organism.

HARRISON, J. M. (1948.) **Tuberculosis in a wild sparrow-hawk** (*Accipiter nisus nisus*).—*J. Path. Bact.* **60.** 583–586. [Author's summary copied *verbatim.*] **2060**

An acid-fast infection resembling avian tuberculosis caused the death of a wild adult male sparrow-hawk (*Accipiter nisus nisus*). The distribution of the lesions included the liver, lungs and two major joints with their associated ligamentous and muscular structures. The post-mortem and histological appearances are consistent with a tuberculous infection, and the demonstration of acid-fast organisms with morphological characters indistinguishable from those of *Mycobacterium tuberculosis* confirms the suggested diagnosis. The appearances were in keeping with an initial infection by way of the alimentary tract and later spread by the blood and lymphatics and by direct extension.

CUTHBERT, J., & DAVIDSON, G. G. (1948.) **The chick-embryo in sanatorium practice.**—*Brit. J. Tuberc.* **42.** 83–88. **2061**

The developing chick embryo was employed as a living culture medium for tubercle bacilli. For diagnostic purposes it is no substitute for the g. pig, as small numbers of organisms do not cause infection, particularly if the strain is not very virulent. The yield of tuberculous chorio-allantoic membranes depends largely on the virulence of the organisms. The chick embryo seems to be more suitable for research purposes than for routine, the wastage involved being so high as to make the cost prohibitive.—A. M.-H.

FORBES, G. B., & STRANGE, F. G. ST. C. (1949.) **Tuberculous abscess at the site of penicillin injections.**—*Lancet.* **256.** 478–479. [Authors' summary copied *verbatim.*] **2062**

A case of tuberculous abscess developing deeply in the thigh at the site of previous penicillin injections is described. Reasons are given for supposing that the infection was haematogenous.

STRAUB, M., & SCHORNAGEL, H. E. (1948.) De vorm van tuberculose na behandeling met

streptomycine. **[The appearances in tuberculosis after treatment with streptomycin.]**—*Ned. Tijdschr. Geneesk.* **92.** 832–840. [Abst. in *Bull. Hyg., Lond.* **23.** 490. (1948), copied *verbatim.* Signed: A. L. WINNER.] **2063**

The post-mortem appearances are carefully reviewed in four persons suffering from tuberculous meningitis who died in spite of treatment with streptomycin. The authors find that in every case the acute exudative manifestations, whether in meninges, lungs or elsewhere, had responded excellently to treatment and were showing complete or nearly complete healing. These foci, however, were so acute and newly developed that they had not begun to show any sign of the specific tissue reaction to tuberculosis. In every case death was due to older, less acute proliferative lesions which, showing evidence of tuberculous granulation tissue and caseation, had apparently been untouched by streptomycin. They suggest that one reason for this may be the spreading nature of the lesions, and the inflammatory obliteration of blood vessels, together with the difficulty of getting the drug into the ventricles.

In the meningitis cases they contrast the acute exudative inflammation in the pia-arachnoid, which can be completely cleared by streptomycin, with the tubercles within the brain substance, which are relatively untouched. In miliary tuberculosis too they distinguish between the (histologically) acute form, which responds promptly, and the subacute or chronic form with some tendency to spontaneous healing, which does not react to treatment. They point out that it is important both for prognosis and therapy to distinguish these types clinically, and they suggest that the function of streptomycin may be to prolong life by curing the lethal acute manifestations, thus giving the natural resistance a chance to limit the subacute and chronic foci.

WHITE, E. F., & KARLSON, A. G. (1948.) **Procedure for distinguishing drugs effective against the tubercle bacillus by a combined *in vivo* and *in vitro* method.**—*Proc. Staff Meet., Mayo Clin.* **23.** 52. [Abst. in *Amer. Rev. Tuberc.* **58.** No. 5. p. 35 of absts. (1948), copied *verbatim.* Signed: P. Q. EDWARDS.] **2064**

An attempt to devise a rapid and economical method of assaying the tuberculostatic property of compounds resulted in the following procedure: serum of animals that had received the drug to be tested was incorporated in a liquid medium which was then inoculated with tubercle bacilli of human type. The presence or absence of an inhibitory action of a compound on the growth of the culture could be observed and its effect *in vivo* could be anticipated. This suggests a method for overcoming the usual discrepancy between the results of *in vitro* and *in vivo* testing of substances for their activity against the tubercle bacillus.

MYREN, J. (1948.) Kan BCG-vaksinens effektivitet økes ved større doser? Er det norske tuberkulin for tiden bedre enn det danske? **[Can the effectiveness of BCG vaccine be increased by increasing the dosage? Is Norwegian tuberculin at present better than Danish tuberculin?]**—*Tidsskr. norske Laegeforen.* **68.** 103–105. [Abst. in *Bull. Hyg., Lond.* **23.** 403. (1948), copied *verbatim.* Signed: CLAUDE LILLINGSTON.] **2065**

In the course of vaccinating by the intracutaneous method with BCG, Myren failed to notice that one consignment of the vaccine received from the BCG Laboratory in Bergen was intended for percutaneous vaccination. Altogether 66 persons were given intracutaneous injections of this preparation, whose concentration was 40 times as great as that of BCG vaccine intended for intracutaneous injection. The reaction was very lively, and superficial ulceration ensued in most cases. But the children remained up and about, and two months later many of the ulcers had already healed. Most of them were lined with granulation tissue, around which there was no appreciable rubor. The happy issue from this affliction has encouraged Myren to suggest that re-vaccination of persons failing to react to the first dose of BCG should be carried out with increasing doses. As for the comparative value of Norwegian and Danish tuberculin, Myren's experience favours the former.

BAUMANN, T. (1948.) Die B.C.G.-Impfung. Wünschbarkeit ihrer Einführung in der Schweiz. **[BCG vaccination. Desirability of its introduction in Switzerland.]**—*Schweiz. med. Wschr.* **78.** 317–324. [Abst. in *Bull. Hyg., Lond.* **23.** 580. (1948), copied *verbatim.* Signed: W. H. TYTLER.] **2066**

This is an extensive review, similar to other recent ones, of the present state of BCG vaccination, and the more important evidence bearing on its efficacy.

The epidemiology and pathogenesis of pulmonary tuberculosis are discussed on general lines, with particular attention to the dangers of primary infection in the anergic adult. Early work on BCG is considered briefly, but the author concludes that the results of mouth vaccination are too unreliable for serious consideration. The remainder of the review is concerned with the well-known Scandinavian work of HEIMBECK, SCHEEL, WALLGREN, ANDERSON and BELFRAGE, etc., and that of FERGUSON in Canada. The author concludes that intracutaneous vaccination with BCG confers a clear protection against

primary virulent infection, or against progressive disease following directly on virulent primary infection, but that if the primary infection is not completely checked there is less inhibition of later secondary or tertiary lesions. The decreased morbidity observed in vaccinated persons is entirely due to prevention of disease associated with the primary process.

A strong plea is made for the use of BCG in Switzerland, particularly among the usual population groups of children under 5, and adolescents from 14 to 25, especially those in contact with infection. An extensive bibliography is concluded, covering all the more important work.

NEIMAN, I. S., & HOLMGREN, N. (1949.) **A comparison of the immunogenicity for guinea pigs of BCG cultured intermittently and continuously in the presence of bile.**—*Amer. Rev. Tuberc.* **59.** 102–105. [Spanish summary. English summary copied *verbatim.*] **2067**

An experiment is described designed to determine whether the immunogenic ability of BCG, which is ordinarily cultured intermittently in the presence of ox-bile, is changed by continuous association with ox-bile. The results suggest that the possible loss of potency that could theoretically accrue to the vaccine because of exposure to bile has not yet made its appearance although BCG has been in continual cultivation on an artificial medium for thirty-nine years.

CUMMINGS, M. M., DRUMMOND, M. C., & LEWIS, G. T. (1948.) **Effect of different methods of coagulation of culture media on tubercle bacilli growth.**—*Publ. Hlth Rep., Wash.* **63.** 1305–1312. [Summary and conclusions copied *verbatim.*] **2068**

Experiments have been carried out which demonstrate: (1.) Heating increases the amount of ether-soluble acid in the media described. (2.) About twice as much of this ether-soluble acid is present after autoclaving at 100°C. as following inspissation at 58°C. (3.) The growth of the H37 Rv strain of the tubercle bacillus is impaired as the content of the ether-soluble acidic material increases in the medium.

Variations in the sensitivity of certain complex organic media for the growth of tubercle bacilli may be due to differences in the procedures for the coagulation of such media. These coagulation procedures cause the liberation in the media of varying amounts of ether-soluble acidic material which appears to inhibit the growth of the tubercle bacilli.

FITZGERALD, R. J., & BERNHEIM, F. (1948.) **The effect of sodium fluoride on the metabolism of certain mycobacteria.**—*J. Bact.* **55.** 677–682. [Authors' summary copied *verbatim.*] **2069**

The oxygen uptake of washed suspensions of *Mycobacterium* BCG is greatly increased by sodium fluoride. The amount of the increase depends on the relative concentrations of fluoride and bacteria and upon the hydrogen ion concentration.

The effect is greatest at pH 6·0, intermediate at pH 6·7, and least at pH 7·8. At pH 6·0 the increased uptake is accompanied by a rise in R.Q. At pH 6·0 the oxidation of pyruvic acid and lactic acid is increased by fluoride, both in rate and amount. The effect diminishes at lower hydrogen ion concentrations. At pH 6·7 and 7·8 the oxidation of glucose, fructose, and trehalose is increased by fluoride. At pH 6·0 fluoride inhibits the oxidation of these sugars. At pH 6·0 the oxidation of acetic, heptylic, oleic, and benzoic acids is inhibited by fluoride. At lower hydrogen ion concentrations fluoride has no effect. At pH 6·0, 5 to 10 mg per cent fluoride inhibits growth, and the presence of lactate increases the inhibition. At pH 7·0 there was no inhibition by fluoride either in the presence or absence of lactate.

BISSET, K. A. (1949.) **Observations upon the cytology of corynebacteria and mycobacteria.**—*J. gen. Microbiol.* **3.** 93–96. [Author's summary copied *verbatim.*] **2070**

Bacilli in young cultures of corynebacteria and mycobacteria are multicellular. The individual cells are almost spherical, and a single bacillus may contain from one to twelve or more units. Reproduction may take place by division of the constituent cells, followed by simple fission of the bacillus, or alternatively by fragmentation into single cells which subdivide without separating and grow into multicellular bacilli once more. The latter phenomenon may account for previous description of life cycles in these genera.

The nuclear units are small, spherical granules, resembling those of some species of cocci. The characteristic morphology of corynebacteria and mycobacteria is an artefact, resulting from drying and heat-fixation. These genera do not appear to possess any morphological characters in common with the true *Actinomyces*, with which they are at present classified.

LUZZATTI, A. C. (1945.) Malleomyces pseudomallei (Loefflerella whitmori)—di un raro reperto batteriologico in un caso di affezione oculare. [**A rare bacteriological report on eye-infection by *Pfeifferella whitmori.* (Human).**]—*Atti Accad. Fisiocr. Siena.* **13.** 99. [Abst. from abst. in *G. Batt. Immun.* **36.** 375. (1947).] **2071**

An account of *Pf. whitmori* infection in a human being.

SARIŠSKÝ, P. (1948.) Rozdielná vnímavosť

veprov voči červienke vo svetle fagocytárného a opsoninového indexu. [**Study of the opsono-phagocytic index in relation to the resistance of pigs to** *Erysipelothrix rhusiopathiae*.]—*Čas. československ. Vet.* **3.** 713–728. **2072**

S. examined the opsono-phagocytic index of blood samples from 250 pigs and piglets, divided into five groups according to age and weight; the detailed results are tabulated. The lowering of the index with growing age, indicated a decrease in resistance. S. considers that preventive inoculation increases the resistance.—E. G.

HUPBAUER, A. (1947.) Da li svinje simultano cijepljene protiv vrbanca izlučuju klice cjepne kulture? [**Do pigs immunized against** *Erysipelothrix rhusiopathiae* **excrete swine erysipelas organisms?**]—*Vet. Arhiv.* **17.** 257–263. [Abst. from German summary.] **2073**

Individual samples of urine from 14 pigs were examined 3–8 days after immunization. The samples were centrifuged and the centrifugate was plated on broth or agar and also inoculated into mice. *Erysipelothrix rhusiopathiae* could not be detected in the urine. Similar tests on blood samples taken 3–8 days after immunization also gave negative reactions, indicating that the organisms had not entered the blood stream. This conclusion relates only to animals which had not contracted "immunization erysipelas", but the conditions should be the same as those in naturally diseased animals.

In "immunization erysipelas" the question arose whether the disease was the result of the vaccine or whether activation of a latent infection was involved, the inoculation being only the last impetus to this activation. The question was relevant since "immunization erysipelas" following inoculation with formol vaccine (killed organisms) had recently increased.

In immunizing with living organisms it was not possible, when erysipelas appeared, to decide whether excreted organisms derived from the culture or from activated latent infection. In "immunization erysipelas" following inoculation with killed organisms, only organisms of activated infection could be involved.—K. J. SINCLAIR.

MANTOVANI, G. (1948.) Sulle modificazioni dei caratteri morfologici, culturali e biologici del bacillo del mal rossino (*Erysipelothrix rhusiopathiae*) in terreni al verde malachite. [**Modifications of the morphological, cultural and biological characters of** *Erysipelothrix rhusiopathiae* **in medium containing malachite green.**]—*G. Batt. Immun.* **39.** 203–216. [English, French and German summaries.] **2074**

When *E. rhusiopathiae* is seeded into nutrient broth containing malachite green in dilutions from 1 : 500 to 1 : 2,000, the organisms are killed and dissolved, and suspensions are non-antigenic. If the dilution of malachite green is between 1 : 3,000 and 1 : 10,000 the organisms start growing in about 36 hours, and variants, with the morphological and cultural characteristics of the R type, develop. Cultures lose their pathogenicity for the white mouse, and their immunizing power.

In malachite green broth of dilutions 1 : 15,000 to 1 : 30,000 cultures begin to grow after 16 hours. These also are innocuous, but slightly antigenic provided the cultures are not more than 48 hours old. Dilutions of 1 : 35,000 to 1 : 45,000 of malachite green do not influence either the growth or the pathogenicity of the organisms.—I. W. JENNINGS.

HJÄRRE, A., & WRAMBY, G. (1945.) Undersökningar över en med specifika granulom förlöpande hönssjukdom orsakad av mukoida kolibakterier (Koli-granulom). [**A specific granulomatous disease of fowls caused by mucoid forms of** *Bacterium coli*.]—*Skand. VetTidskr.* **35.** 449–507. [Abst. from English summary.] **2075**

The authors describe a tuberculosis-like granulomatous disease of the liver and caeca of fowls. By means of intramuscular injections of a suspension of the tissue pulp of the granuloma and intravenous injection of the mucoid phase of *Bact. coli* isolated from the lesions, they set up the disease experimentally. The R and S phases reproduced the disease to a lesser degree. Attempts to develop the disease with the precipitated capsular substance of the organism in the mucoid phase failed.

The presence of this organism could not be demonstrated in the granuloma produced by the R phase. This would account for negative bacteriological findings in some spontaneous cases.

The mucoid form also set up granulomata in the liver, kidney and lungs of white mice and rabbits. Infection appeared to take place *via* the digestive tract, but attempts to produce the disease by feeding with pure cultures of the organism or granuloma tissue were not successful.

The granulomatous lesions in question closely resembled those of TB.—E. G.

SCHOFIELD, F. W. (1947.) **Hjarre and Wramby disease in turkeys (coli-granuloma).**—*Canad. J. comp. Med.* **11.** 141–143. **2076**

During a visit to Manitoba during the summer of 1946 a serious disease of turkeys was encountered. The characteristic lesions were tuberculosis-like nodules in the liver. Neither acid-fast organisms nor histomonads could be demonstrated. Tissues were contaminated when received

at the laboratory and the cultures of *Bact. coli* isolated did not reproduce the disease. From the pathological findings it was believed that the disease was identical with the coli-granuloma of HJÄRRE & WRAMBY [see preceding abst.]. It may be very readily confused with TB.—R. GWATKIN.

WEILAND, P. (1947.) Zur Virulenzfrage der Colibakterien. **[The problem of the virulence of *Bact. coli*.]**—*Klin. Wschr.* **24.** 712–716. [Abst. in *Bull. Hyg., Lond.* **23.** 635. (1948), copied *verbatim.* Signed: J. C. CRUICKSHANK.] **2077**

Numerous workers have attempted to differentiate pathogenic from non-pathogenic strains of *Bact. coli* by biochemical and serological tests and by determining their virulence to laboratory animals. These tests have not given satisfactory results. Other workers have claimed to distinguish pathogenic strains by their capacity to produce endotoxins. The author, working on similar lines, made trichloracetic acid extracts from 27 strains by Boivin's method and tested their toxicity by intraperitoneal injection into mice. All the extracts, including those from 16 strains isolated from normal stools, proved to be toxic, and the author concludes that this method is without value for the determination of virulence. He found that the toxicity of the extracts was almost invariably lost on filtration and he cleared his extracts by high-speed centrifugation. This observation may account for some of the divergent results obtained by previous workers.

YOUMANS, A. S. (1948.) **The relationship of the age of the bacterial culture to the delay in sulfonamide bacteriostasis.**—*J. Bact.* **55.** 503–515. [Author's summary slightly amended.] **2078**

Sulfanilamide when added to either synthetic or nutrient media together with an inoculum of *Escherichia coli* consisting of old cells produced prompt inhibition of growth. This prompt inhibition shown by sulfanilamide on *E. coli* was not influenced by (a) the concentration of sulphanilamide, (b) the size of the bacterial inoculum, (c) the strain of *E. coli* used, (d) the culture phase of the organism, or (e) the use of unwashed instead of washed cells for an inoculum. A delay in the bacteriostatic action of sulfonamide occurred only when it was added to cultures of *E. coli*, in either synthetic or nutrient media, just prior to or during the logarithmic phase of growth. Changes in the pH, the medium, or the bacterial population did not influence the occurrence of the delay in the bacteriostatic action. Sulfanilamide did not significantly alter the size or shape of the individual cells in cultures of *E. coli*. Young, actively metabolizing and multiplying cultures of *E. coli* are more resistant to the bacteriostatic action of sulfanilamide, whereas older and slowly metabolizing and multiplying cells of *E. coli* are more susceptible.

CLAPPER, W. E., & KURITA, I. T. (1948.) **The effect of several compounds on the inhibition of bacterial growth by sulfaguanidine, sulfamerazine, and sulfasuxidine.**—*J. Bact.* **55.** 277–284. [Authors' summary copied *verbatim.*] **2079**

The effect of 19 compounds on the growth of *Escherichia coli* and *Salmonella paratyphi* B was determined.

The effect of these compounds on the inhibition of growth of *S. paratyphi* B by sulfamerazine, sulfaguanidine, and sulfasuxidine, and of *E. coli* by sulfamerazine and sulfaguanidine was determined. Allantoin, thiamine, and urea enhanced the bacteriostatic action in some cases.

The acid produced and the glucose utilized were determined in the absence and in the presence of those compounds that stimulated the growth of either organism. Glucose utilization was increased in all cases. A significant increase in acid production was seen only with asparagine, cystine, and tryptophane.

Asparagine, cystine, and tryptophane increased acid production and glucose utilization by *S. paratyphi* B in the presence of sulfamerazine, sulfaguanidine, and sulfasuxidine. This corresponded with the reversal of the bacteriostatic action of the sulfonamides.

GRIFFITTS, J. J. (1948.) **Haemagglutination by bacterial suspensions with special reference to *Shigella alkalescens*.**—*Proc. Soc. exp. Biol., N.Y.* **67.** 358–362. [Abst. in *Bull. Hyg., Lond.* **23.** 801. (1948), copied *verbatim.* Signed: J. C. CRUICKSHANK.] **2080**

Human Group O Rh-negative red blood cells were agglutinated by saline suspensions of *Shigella alkalescens* and by certain strains of *V. cholerae*, *Str. pyogenes*, *Haem. bronchisepticus* and *Haem. pertussis*, but not by suspensions of a large number of other bacteria. Haemagglutination was more complete and rapid with *Sh. alkalescens* and this organism was selected for further study.

Suspensions of *Sh. alkalescens* agglutinated erythrocytes from certain animal species only: for example, human and hog cells were agglutinated but horse cells were not. Haemagglutinating activity was found in the supernatant fluid of suspensions subjected to freezing and thawing. Activity diminished progressively in bacteria repeatedly washed or subjected to heat or treated with phenol or formol. The activity of cultures was greatest after about 5–7 days' incubation. Haemagglutination occurred at all temperatures

from 5°C. to 56°C., but was not observed with organisms which had been washed after agglutination with specific serum, or with subcultures from strains stored on agar in the ice-chest for 6 weeks.

This phenomenon may have an application in bacterial identification and in studies of haemagglutination in general.

FELSENFELD, O., YOUNG, V. M., & CONNER, P. (1947.) **Progress in the knowledge of Gram-negative enteric pathogenic organisms during the years from 1939 to 1945.**—*Pontificia Academia Scientiarvm Relationes de Avctis Scientiis tempore Belli* A1939–1945. No. 16. (1947. Vatican City.) 75 pp. [Abst. in *Bull. Hyg., Lond.* **23.** 283. (1948), copied *verbatim.* Signed: CHARLES WILCOCKS.] **2081**

This is an annotated bibliography of the subject in which the authors (writing from Mount Sinai Medical Research Foundation, U.S.A.) have provided very brief notes on the scientific literature in the English, Spanish and Portuguese languages, which appeared between January 1939 and December 1945. Notes are also included on such papers in French, Dutch and certain other languages, as were available.

In the comparatively small space of 75 pages the authors could do little more than write a sentence on each of the large mass of papers referred to. The purpose of the review is to convey information quickly to scientists in countries where there was no opportunity to keep up with progress during the war.

The publication deals with the genus *Salmonella* (a list of new types being given), and *Shigella*, and contains a section on the laboratory diagnosis of *Salmonella* and *Shigella* infections. There are short sections on antibiotics, other Enterobacteriaceae, *Proteus*, *Pseudomonas*, and vibrios; and on general public health aspects.

SLANETZ, C. A. (1948.) **The control of salmonella infections in colonies of mice.**—*J. Bact.* **56.** 771–775. [Author's summary copied *verbatim.*] **2082**

A practical method for the control of *Salmonella* infection in breeding colonies of mice has been developed in the feces culture method.

An incidence of less than 0·4 per cent of paratyphoid carriers was obtained in a large commercial mouse colony by the individual-mouse single-test method.

To maintain a low incidence of *Salmonella* infection in a breeding colony it is necessary to test young adult mice weighing approximately 20 grams prior to mating. Use of weanling mice resulted in a higher percentage of carriers.

HARRIS, J. O. (1948.) **The respiration of *Salmonella* in the presence of agglutinating serum.**—*J. Bact.* **56.** 271–275. [Author's summary copied *verbatim.*] **2083**

Oxygen uptake, with glucose as the substrate, by eight species of *Salmonella* occurred at essentially the same rate when the cells were in the presence of fresh immune rabbit serum as when in fresh normal serum. Varying the proportions of agglutinin to cells over a wide range, with sera of both high and low titer, gave no indication of a zone exhibiting antienzyme activity affecting respiration. Dehydrogenase activity of four species was studied upon nine organic substrates. Reduction of methylene blue in the presence of a specific substrate occurred at the same rate when the cells were treated with fresh immune serum as with normal agglutinin-free serum.

TEY, J. A. (1948.) Principales caracteres bacteriologicos y biologicos de las brucelas. **[Chief characteristics of the brucella group.]** —*Rev. Asoc. med. argent.* **62.** 109–110. [Abst. in *Bull. Hyg., Lond.* **23.** 589. (1948), copied *verbatim.* Signed: H. HAROLD SCOTT.] **2084**

At a meeting of the Argentine Medical Association held in September, 1947, a series of papers on the brucellae and brucellosis were read. This, the first, describes briefly the general characters of members of the group. The history is sketched from the discovery of "*Micrococcus melitensis*" in cases of Malta Fever by Bruce in 1887, Bang's discovery of the organism of infectious abortion in 1897, Traum's isolation of the cause of genital infections in 1914, and Evan's work on the different strains in 1918. Two years later, the name *Brucella* was given to the group of three species: *melitensis* in goats and sheep; *abortus* in the cow, and *suis* in the pig, but further study showed that the hosts were not specific and that all three types might infect all these animals and also man. The author goes on to describe the morphological characters and their differentiation by conditions of growth—presence or absence of CO_2, the effect of dyes, the production and time of production of H_2S—and agglutination; the R and S types. Lastly, the mode of infection, by the alimentary tract or skin or by sexual contact and, perhaps, by insect transmission and the presence of the organism in milk and milk-products. [The article is a good introductory summary.]

DALLING, T. (1948.) **Brucellosis (bovine contagious abortion).**—*Vet. Rec.* **60.** 59 & 60. **2085**

As strain 19 vaccine consists of a suspension of living *Br. abortus* organisms, especial care must be taken with its storage and use for vaccination. The local and systemic reactions which may occur

after vaccination usually pass off in a few days. General questions are discussed, including the optimum age for vaccination, re-vaccination and the length of immunity.—J. I. TAYLOR.

CHRISTIANSEN, M. J. (1948.) Om Abortus-Bang-Ringprøven og Anvendelse i den praktiske Kastningsbekaempelse. [**The *Brucella abortus* ring test and its practical use in control of (bovine) abortion.**]—*Maanedsskr. Dyrlaeg.* **59.** 193–230. [English summary.] **2086**

This is a detailed account of very large scale trials to compare the ring test using milk, with the slow blood agglutination test. The work extended over two years and over 16,000 herds, and in different groups of these there was a 93–95% agreement between the tests. About half the disagreements were not real, but due to faulty labelling of samples, and part of the remainder, in which the milk test yielded positive and the blood test negative reactions, was the result of the blood test critical titre being less strict than the corresponding one for the milk test. The conclusion was formed that the ring test is easy, rapid and reliable if done carefully.—J. E.

CAMERON, H. S. (1947.) **Brucellosis eradication and its effect on production in a large swine herd.**—*Cornell Vet.* **37.** 55–58. **2087**

C. describes the eradication of brucellosis in eleven months from a herd of 288 pigs with the minimum of blood testing. The pigs were in units of 10–15 sows or gilts and on pasture throughout the year.

At the first test 37% reacted to a titre $> 1 : 25$. If there were any reactors in a unit, the whole unit was considered positive and no further attempt was made to breed from any of these pigs. Two months later, 10% of the remaining 127 pigs reacted and after a further two months 14% of the pigs were reactors, but all, however, confined to one unit. Eleven months from the start of the scheme the herd was free from infection. Although there were reactors among the weaners, after the same procedure had been followed with this group all reactions had become negative in five months. The average litter size had increased by 3·4 pigs at the end of the year under review.

C. points out that this drastic culling policy is only possible under suitable economic conditions and may require considerable modification. —J. I. TAYLOR.

ASCOLI, A., & KETOVER, N. (1948.) **Splenomegaly in the *Brucella-abortus*-infected albino rat.** —*Cornell Vet.* **38.** 424–426. [Authors' summary copied *verbatim.*] **2088**

The intraperitoneal inoculation of albino rats with serum from calves vaccinated against *Brucella abortus*, followed after 24 hours by the inoculation of one MLD of *B. abortus* by the same route, provides a method for the experimental production of splenomegaly. A possible application of this method could be in the investigation of the role of the spleen in the defense against infections.

In the albino rat the removal of the spleen causes a lowering of the resistance against intraperitoneal inoculation of *B. abortus*.

The administration of protective serum against *B. abortus* prior to inoculation with *Brucella* organisms seems to be less effective in splenectomized than in laparotomized rats.

An investigation of the relationship between the protective action of the serum and the role of the spleen in the defense against *B. abortus* in the albino rat would appear to be justified.

DIAZ CASTRO, H. (1946.) Brucelosis genital en el hombre. [**Genital brucellosis in man.**]—*Arch. urug. Med.* **29.** 61–86; 148–163. [Copied *verbatim* from abst. in *Bull. Hyg., Lond.* **24.** 33–34. (1949). Signed: H. HAROLD SCOTT.] **2089**

Infection of the genitalia in man by *Brucella* is always secondary to a generalized systemic infection. The portal of entry is the urethra. It is said that many prostitutes in Malta harbour genital infection with *Br. melitensis*. Though entering *per urethram* it does not cause urethritis or at least any symptom of it, but gains the general blood circulation. Genital brucellosis causes epididymitis, orchitis and prostatovesiculitis. These complications usually occur after two accessions of fever (but it may be more); more rarely during an advanced stage of the disease or even during convalescence. In Uruguay, *Br. abortus* is the causative organism.

After these general considerations, the author describes the pathological anatomy and morbid histology in detail, as regards each constituent tissue of the epididymitis.

In the second section of this article, the clinical aspect is dealt with. It is shown that the epididymitis and the genital infection as a whole is but an episode, as it were, in the general infection and that the regular course of the disease is not really affected thereby. In other words, when this complication clears up the undulant fever pursues its customary course.

SPINK, W. W., HOFFBAUER, F. W., WALKER, W. W., & GREEN, R. A. (1949.) **Histopathology of the liver in human brucellosis.**—*J. Lab. clin. Med.* **34.** 40–58. [Authors' summary copied *verbatim.*] **2090**

Biopsies of the liver have been carried out in ten patients with active brucellosis. The histologic appearance of tissue obtained post mortem

has been described for an eleventh case. A battery of liver function tests was carried out simultaneously with the biopsies in ten cases.

The basic hepatic lesions are granulomas in the lobules and portal spaces, along with a cellular infiltrate in the portal areas. The granuloma is not specific for brucellosis and cannot be distinguished from sarcoidosis, and, in some instances, from the lesions of tuberculosis and syphilis.

In several instances, there was little or no deviation from normal in the liver function tests, although definite histologic changes were apparent. While a direct relationship between brucellosis and cirrhosis of the liver has not been established, there is accumulating evidence that brucellosis may play an important accessory role in the genesis of cirrhosis.

It is suggested that biopsy of the liver may be employed for diagnostic purposes in doubtful cases of human brucellosis.

SPINK, W. W. (1948.) **Pathogenesis of human brucellosis with respect to prevention and treatment.**—*Ann. intern. Med.* **29.** 238–258. [Abst. in *Bull. Hyg., Lond.* **23.** 954–955. (1948), copied *verbatim.* Signed: R. LOVELL.] **2091**

As some evidence suggests that human infections with *Brucella* are increasing, then it may become a major public health problem. The reservoir of infection is in domestic animals, especially cattle, pigs and goats, and the disease is transmitted from such species to man, and rarely, if at all, from man to man; the ultimate elimination of the disease, therefore, depends on its eradication from animals, and the efforts of veterinarians to accomplish this should have the support of the medical profession. This is a long-term policy and in the meantime the pasteurization of all milk for human consumption would protect a large section of the population. It is not so easy to protect those who contract the disease from actual contact with infected animals.

Brucella invade those organs associated with the reticulo-endothelial system and the invasion of these tissues results in an intracellular parasitism involving proliferation of epithelioid cells and formation of giant cells. Complications include destructive osseous lesions, subacute bacterial endocarditis, encephalitis and suppurative lesions. The tissues may become hypersensitive to specific bacterial products thereby complicating the symptomatology and further study of the immunological aspect of the disease is indicated; the limitations of the value of the serological reactions used for diagnosis are frequently overlooked.

Effective therapy should not only control the infection, but eradicate it from the tissues; and the combined use of streptomycin and sulphadiazine is advocated as it has been shown to be effective against all three types of *Brucella* in infected chick embryos. Data collected from 17 patients indicate that the clinical course of both acute and chronic cases is shortened with this form of treatment and that it is effective against some of the complications such as subacute bacterial endocarditis and spondylitis. Although the optimal dosage is not yet known it is recommended that 0·5 gm. of streptomycin be given intramuscularly every six hours for two weeks and that at the time this is started 3–4 gm. of sulphadiazine be given orally and then 1 gm. every four hours for two weeks.

Although bacteria may develop an increased resistance to streptomycin as a result of therapy, none of those strains of *Brucella* recovered from treated patients has shown this to occur.

It is advocated that milk for human consumption should be pasteurized and that support be given to all measures destined to eradicate the disease from domestic animals.

MOLINELLI, E. A., FERNANDEZ ITHURRAT, E. M., & ITHURRALDE, D. (1948.) Epidemiologia de la brucelosis humana en la Republica Argentina. **[Epidemiology of human brucellosis in the Argentine Republic.]**—*Rev. Asoc. med. argent.* **62.** 111–119. [Abst. in *Bull. Hyg., Lond.* **23.** 589. (1948), copied *verbatim.* Signed: H. HAROLD SCOTT.] **2092**

The information contained in this article is well epitomized in a series of tables. Important points brought out are the following: that as regards prevalence, the Argentine Republic may be devided vertically into two, a western and an eastern section. In the former, which includes the Provinces of Mendoza, San Juan, La Rioja, Catamarca, Salta and Jujuy, infection is by *Br. melitensis* exclusively; in the latter, comprising Capital Federal and the Provinces of Buenos Aires, Santa Fé, Entre Rios, Corrientes, together with Chaco and Formosa, the *suis* and *abortus* species prevail. This deduction is based on a study of 2,000 observations and of 438 examined bacteriologically. Of 180 in the eastern section thus examined, there were 16 infections with *Br. melitensis*, 93 with *Br. suis*, 67 with *Br. abortus* and 4 atypical, whereas of the western section 257 were *Br. melitensis* infections and one an atypical strain. In the Andes provinces many human cases are due to consumption of goats'-milk products. Study of the ages of the 2,000 patients showed that 1,088, or more than half, were aged 20–40, the numbers in successive decades being 56 males, 49 females (105 together); 190 and 120 (310); 410 and 118 (528); 465 and 95 (560); 275 and 41 (316); 91 and 32 (123); 40 and 12 (52) and 3 each in those above 70 years;

altogether 1,530 males to 470 females. Another very detailed table analyses the source and mode of infection in 1,787 cases, distributed according to sex and region of contracting the disease, whether by contact with the animals or their products, or by ingestion, or by the possible combination of manipulation and ingestion.

EISELE, C. W., MCCULLOUGH, N. B., & BEAL, G. A. (1947.) **Discrepancies in the agglutination test for brucellosis as performed with various antigens and as reported from different laboratories.**—*J. Lab. clin. Med.* **32.** 847–853. [Authors' summary copied *verbatim.*] **2093**

Wide variations in brucella agglutinin titers were observed in each of twenty-one sera tested with ten different antigens in our laboratory. Tests on the same sera made in five other laboratories showed equally great discrepancies.

Of the twenty-one sera tested, eighteen were called negative by one or more laboratories. Of these eighteen " negative sera," sixteen, or 89 per cent, were elsewhere called positive in titers of 1 : 200 or higher; twelve, or 67 per cent, were called positive in dilutions of 1 : 320 or 1 : 640-titers which are frequently considered as substantiating a clinical diagnosis of brucellosis.

Depending on which laboratory report is accepted as the actual titer, two-thirds of the eighteen cases can be either " ruled out " or " substantiated " by commonly accepted but deplorable practices of interpretation of the test.

Limited observations on typhoid and paratyphoid agglutination tests suggest that the variations observed in the tests for brucella also occur in other tests.

LEÓN, A. P., SOSA, M. J., & BERNAL, E. (1947.) La reacción de aglutinación de la brucella en enfermos de brucelosis y en personas supuestas sanas, de la ciudad de Mexico. **[The brucella agglutination reaction in patients with brucellosis and in supposedly healthy persons in the City of Mexico.]**—*Rev. Inst. Salubridad y Enfermedades Trop.* **8.** 49–56. [Abst. in *Bull. Hyg., Lond.* **23.** 107–108. (1948), copied *verbatim.* Signed: J. C. CRUICKSHANK.] **2094**

The antigen used in this work was prepared from *Br. abortus* [but the caption to the chart refers to *Br. melitensis*]. Agglutinins at a titre of 1/25 or over were found in the sera of 9·2 per cent. of 1,156 normal persons; 4·8 per cent. had titres of 1/50 or over, and 1·4 per cent. of 1/100 or over. The sera of 88·9 per cent. of 63 patients suffering from *Brucella* infection contained agglutinins at 1/25 or over. Agglutinins were frequently absent in disease of less than one month's or more than a year's duration. Low titres were not uncommonly recorded up to the third month of illness, but it was usual to observe titres from 1/100 to 1/10,000 in cases in which the disease had lasted longer than one month. Where clinical signs were obscure, and agglutinins absent or present to low titre, tests for allergy and estimation of the opsonocytophagic index were found of value. Blood culture was positive in two-thirds of the patients, the infecting organism being *Br. melitensis* in each case.

OTTOSEN, H. E., & PLUM, N. (1949.) **A non-antigenic allergic agent for intradermal brucellosis tests.**—*Amer. J. vet. Res.* **10.** 5–11. **2095**

After various unsuccessful attempts, a non-antigenic purified extract of *Brucella abortus* was prepared using Lancefield's acid extraction method. Intradermal injections produced allergic reactions in *Brucella*-infected g. pigs, but scarcely any reaction in normal g. pigs. Preliminary experiments with cattle yielded similar findings although the results of the intradermal and agglutination tests did not always agree.—J. I. TAYLOR.

MCDIARMID, A. (1948.) **A comparison of the immunity produced in guinea-pigs by the inoculation of S.19 *Br. abortus* vaccine intradermally and subcutaneously.**—*Vet. Rec.* **60.** 227–228. **2096**

The immunity in g. pigs to an infective dose of *Br. abortus* given six weeks after vaccination was practically the same either by an intradermal vaccination of 0·2 ml. of a 1 : 5 dilution of strain 19 vaccine or by a subcutaneous inoculation of 1 ml. of the same vaccine.—J. I. TAYLOR.

GOLEM, S. B. (1944.) Insan ve Ehli Hayvanlarda Tularemi Bakimindan Serolojik Arastirma. **[Serological tests for tularaemia in man and domestic animals (in Turkey).]**—*Rev. Turque d'Hyg. et de Biol. Exper.* **4.** 34–53. [Abst. in *Bull. Hyg., Lond.* **22.** 513–514. (1947), copied *verbatim.* Signed: CHARLES WILCOCKS.] **2097**

Tests carried out on 1,150 specimens of serum, from 48 Prefectures, showed 10·8 per cent. positive results in men and 22·1 per cent. in women; dilutions at which the sera were positive ranged from 1 in 10 to 1 in 320. The positive specimens came from 18 prefectures, which are named in the body of the paper; the disease is endemic in Thrace (43·5 per cent. positive), but northern Anatolia appears to be free. Although the tests suggest that women are more generally infected than men, the author remarks that in cases diagnosed clinically, men predominate.

Horses were tested; of 760 specimens, 15·5 per cent. were positive (57·8 per cent. from one prefecture). In some of the places where horses are positive, the human disease is not found, and *vice versa.* Cattle were also tested; of 269 sera, 9·4 per cent. were positive up to 1 in 80. Of 26

buffaloes, 6 agglutinated *Br. tularensis* at 1 in 20 to 1 in 80. Of 114 sheep, 7·9 per cent. were positive up to 1 in 40; of 26 goats, one. Rather higher figures than these averages were found in areas in which tularaemia is known to be endemic.

It is, of course, known that cross agglutination exists between *Br. tularensis* and the other species of *Brucella*, but the author has shown that serum from human tularaemia more often agglutinates *Brucella* [presumably *abortus*] than that of brucellosis agglutinates *Br. tularensis*. In most domestic animals the sera agglutinate the two organisms equally.

In three laboratory infections with *Br. tularensis*, observed for some time, only one showed agglutination for *Brucella* [presumably *abortus*] on one occasion, at 1 in 20; the other two remained negative, though all were positive to *Br. tularensis*.

PUNTIGAM, F. (1947.) Zur Epidemiologie der Tuläramie nach Beobachtungen in Niederösterreich. **[Epidemiology of tularaemia in lower Austria.]**—*Wien. klin. Wschr.* **59.** 103–106; 116–120. [Abst. in *Bull. Hyg., Lond.* **22.** 457–458. (1947), copied *verbatim.* Signed: H. HAROLD SCOTT.] **2098**

[There are several points of interest in this article, an interest somewhat marred by its discursive method of presenting facts and its many repetitions. Also, it would seem to impute to Moses more medical knowledge than he probably possessed to say that prohibition of the flesh of the hare and the coney in Leviticus IV and Deuteronomy XIV was fear of the Israelites' contracting tularaemia.] After sketching the history of [possible] outbreaks of tularaemia in the past 70 years, the author deals more particularly with two outbreaks in the Gänserndorf and Mistelbach districts north of the Danube; one from October 1936 to May 1937 in which about 200 persons were attacked, 94 of them diagnosed serologically; the other from November 1945 to April 1946, the total number attacked being almost the same. In the latter outbreak, of 189 notifications referred to in a table 87 occurred in December, 40 in January, 3 in February, 2 in April. One, a prisoner of war, returning in an exhausted state, died; otherwise there was no fatal case among those infected in the districts concerned. There was a preceding plague of field mice and the infection was in most cases contracted from them or from hares and musk rats. No instance of interhuman infection was proved. Two clearly reproduced spot-maps show the distribution of cases in the two outbreaks. A useful table is included with the names of 30 animals known to be naturally infected, together with their habitats and the authors who described them, and nearly a score of other animals, mammals, birds and reptiles, which may be latently infected or are experimentally infectible.

MARTIN, R., MERCIER, P., & PERET, R. (1947.) Un nouveau cas de tularémie humaine par morsure. Animal vecteur: le sanglier. **[A new case of human tularaemia following a bite by a wild boar.]**—*Bull. Mém. Soc. Méd. Hôpit., Paris.* Nos. 19/20. 464–467. [Abst. in *Bull. Hyg., Lond.* **23.** 855–856. (1948), slightly modified. Signed: R. LOVELL.] **2099**

The two first cases of proven tularaemia in France were reported in 1946, previous cases were not authenticated bacteriologically. The authors give an account of a third case, of glandular tularaemia, in a cattle dealer who had been bitten in a finger by a wild boar while hunting. The wound was disinfected with alcohol ten minutes later but symptoms developed within 12 days. The patient was eventually admitted to the Pasteur hospital two months later and the diagnosis of tularaemia was made by a serological test; the agglutinin titre against *Brucella tularensis* was then 1 : 1,000.

The case is recorded because of the rarity of the disease following the bite of such a vector; of the 150 cases reported by one authority, 3 only followed the bite of a mammal. It is known that an epidemic of tularaemia occurred at about the same time in hares within a distance of 50 kilometres, and it is suggested that co-operation between medical men and veterinarians is desirable to control tularaemia.

According to the literature, penicillin is of no value as a form of treatment in tularaemia: it was of no value in this case. The administration of streptomycin—100,000 units every 3 hours for 5 days—is reported to be of use but is inadvisable if the disease develops without pulmonary complications. It was not used in this case.

KURSBAN, N. J. (1946.) **Tularemia acquired from the pheasant.**—*J. Amer. med. Ass.* **131.** 1493–1494. [Abst. in *Bull. Hyg., Lond.* **22.** 194. (1947), copied *verbatim.* Signed: R. LOVELL.] **2100**

A second example of transmission of tularaemia [to a human being] from the pheasant is recorded; the onset of the illness occurred 6 days after helping to clean and prepare two pheasants. A clinically typhoidal type of the disease, with pneumonia and pleurisy, developed. No history was available until the tenth day of the disease when penicillin had already failed to change the condition. The disease was then diagnosed by positive agglutination tests against *Br. tularensis* and the recovery of the organism from the pleural fluid by direct culture on glucose-cystine blood-

agar and by the inoculation of mice. Hyperimmune goat serum was given as it was doubtful whether streptomycin could be obtained. Streptomycin was, however, available on the night of the 14th day and its administration was started at once. One million units were given daily by the intramuscular route in 125,000 unit doses every three hours for two days: thereafter, 30,000 units every three hours for 3¾ days, until a total of 2·9 million units had been given.

Although serum therapy induced significant early improvement, the abrupt termination of fever and acceleration of convalescence which occurred were judged to be due chiefly to the streptomycin. If streptomycin alone had been used, the immediate responses would probably have been better and the distressing disability caused by serum sickness would have been avoided.

LARSON, C. L. (1946.) **A skin reaction in rabbits produced by intradermal inoculation of suspensions of killed** *Pasteurella tularensis*.—*Publ. Hlth Rep., Wash.* **61.** 1797–1806. **2101**

Brucella tularensis grown in chick embryos and formolized, was used for intradermal inoculation of rabbits. This antigen contained a toxic element that produced a local reaction and withstood 30 min. exposure at 56°C., but did not withstand boiling: it was destroyed by ether without damage to the antigenic value. The intradermal reaction was inhibited by homologous antisera.—W. R. KERR.

PLASHKES, B. (1948.) [**Enterotoxaemia in sheep and goats.**]—*Refuah vet., Palestine.* **5.** 81. [Abst. from English summary, p. 107.] **2102**

Enterotoxaemia in sheep and goats due to *Clostridium welchii*, type D was diagnosed in Palestine for the first time in 1934. Since then the disease has been encountered in all parts of the country. It is more prevalent in the summer months, but has been known to occur also in the winter. Goats are but rarely affected.

SINHA, K. C. (1948.) **Spore latency in anaerobic infections.**—*Indian Vet. J.* **25.** 122–126. **2103**

S. cited, from the literature, instances of anaerobic infections resulting from spores remaining latent for some time. He also discussed, briefly, conditions which may lead to the establishment of disease from spores present in the tissues. —M. R. DHANDA.

BETHGE, J. (1947.) Die Versporung des Fraenkelschen Gasbacillus (Bac. Welchii Type A, Bac. perfringens) in künstlichen Kulturen. [**Sporing of** *Cl. welchii* **in culture media.**]—*Z. Hyg. InfekKr.* **127.** 452–484. [Abst. in *Bull. Hyg., Lond.* **23.** 814. (1948), copied *verbatim.* Signed: C. L. OAKLEY.] **2104**

Four strains of *Cl. welchii* obtained from cases of gas gangrene in German soldiers on the Russian front have been examined to determine the optimum conditions for spore formation and the properties of the spores. All media used were inoculated from 1-day cultures in liver-broth, in which most forms were Gram positive, no degeneration forms were seen, and no spores. Spore formation was checked by dark-ground microscopy and by Gram-staining of films.

The best results were given by media of high protein content and alkaline reaction with added carbohydrate and peptone. When simple media without added carbohydrate (but not freed from it) were adjusted to *p*H 7·2 with soda, sporing was poorer; when more soda was added, sporing was poorer still; addition of fermentable carbohydrate (*e.g.*, glucose) with soda greatly improved sporing. Addition of fermentable carbohydrate required addition of more soda. Nine to ten per cent. peptone was found to be the optimum concentration. As sources of protein, serum and ascitic fluid were satisfactory; clotting on sterilization could be avoided by heating the protein source with the alkali at 60°–80°C. before addition of the broth. The optimum incubation temperature for spore formation was 37°C. Heat resistance of the spores varied with the strain, and was fully developed only in media offering the optimum conditions for sporing; excellence of media for spore formation can therefore be evaluated by comparing heat resistance of spores formed in them. Short heating at 100°C. may be used to kill off vegetative forms and to demonstrate spores.

Alkaline serum liver-broth cultures of these strains of *Cl. welchii*, grown for 14 days and dried, remained viable after two years in the cold room and two more years at room temperature.

[This is a long, dull, repetitive paper, full of interesting information deeply submerged, and provided at all sorts of levels of proof. The strains showing marked heat resistance (100°C. for 2 hours or more) have since been separated out by Zeissler as *Cl. welchii* type F.]

I. VAN HEYNINGEN, W. E. (1948.) **The biochemistry of the gas gangrene toxins. III. Development of a medium suitable for the large scale production of the toxins of** *Clostridium welchii* **type A.**—*Biochem. J.* **42.** 127–130. **2105**

II. VAN HEYNINGEN, W. E., & BIDWELL, E. (1948.) **The biochemistry of the gas gangrene toxins. IV. The reactions between the** *a*-**toxin (lecithinase) of** *Clostridium welchii* **and its antitoxin.**—*Ibid.* 130–140. **2106**

III. BIDWELL, E., & VAN HEYNINGEN, W. E. (1948.) **The biochemistry of the gas gangrene toxins. V. The** *k*-**toxin (collagenase) of** *Clostridium welchii*.—*Ibid.* 140–149. **2107**

I. When grown on a commercial peptone-

muscle extract medium *Cl. welchii* type A produced good yields of its α-toxin (lecithinase) only irregularly. The author describes the development of an empirical medium, consisting essentially of papain digest of horse muscle pre-treated with alkali, suitable for large-scale production of the toxin.

II. The 50-fold purification by means of ammonium sulphate fractionation of the α-toxin of *Cl. welchii* type A is described. A further five-fold purification could be achieved by nucleic acid precipitation, but the final product was not more than 50% pure. The *Cl. welchii* α-toxin-antitoxin reaction was studied using two techniques:– (1) the determination of the residual toxin or antitoxin content of mixtures of toxin and antitoxin, and (2) the determination of the nitrogen in the floccules precipitated from toxin-antitoxin mixtures. It was found that the α-toxin was capable of combining with antitoxin to form complexes with ratios from T_2A_3–T_6A_5, where T and A represent Lf units of toxin and units of antitoxin respectively. With two batches of toxin TA_2 and T_2A complexes were detected. The various complexes reacted slowly with toxin or antitoxin.

The toxin-antitoxin reaction took place in two stages—toxin-antitoxin union to form a soluble complex, followed by the aggregation of the complex to form an insoluble precipitate. The first stage of the reaction was quantitative, but the second stage may not always be quantitative. It appeared that impurities from the α-toxin preparations could be adsorbed on toxin-antitoxin floccules, and the significance of this finding is discussed.

III. The preparation is described of a proteolytic enzyme, "collagenase" (*k*-toxin), from culture filtrates of *Cl. welchii* type A. Details are given of the purification and estimation of the enzyme, which was obtained substantially free from α- and θ-toxins. Collagenase appeared to attack only collagen and its derivative gelatin; it was most active over a pH range of 6·0–7·5, and was stable in borate but not in phosphate buffers. The activity and antibody-combining capacity of the enzyme were increased after dialysis against borate buffer at pH 10·2. Immune horse sera which neutralized the activity of collagenase-containing filtrates against collagen did not inhibit the activity of the filtrates against gelatin: in some cases, mixtures containing excess antiserum appeared to be even more active than when no antiserum was present. The possible causes for these phenomena and the significance of the findings are discussed.—CLIVE BRIGGS.

MACKNINNON, J. E., & ARTAGAVEYTIA-ALLENDE, R. C. (1948.) **Vitamin deficiencies of seven strains of ectothrix, large-spored trichophytons isolated from man and cattle.**—*J. Bact.* **56.** 91–96. [Authors' summary copied *verbatim*.] **2108**

The effects of thiamine, pyridoxine, and DL-inositol, singly and in all possible combinations, on the growth of several strains of *Trichophyton discoides* Sabouraud and *Trichophyton ochraceum* Sabouraud have been studied on a synthetic basal medium with glucose and asparagine.

Among four strains of *T. discoides* isolated from man in Uruguay, three strains have complete deficiency only for DL-inositol, and one strain has complete deficiencies for DL-inositol, pyridoxine, and thiamine.

Sabouraud's strain of *T. discoides* has a complete deficiency only for thiamine.

Two strains of the species *T. ochraceum* have been studied. They were isolated in Uruguay. One strain, isolated from a calf, has complete deficiencies for DL-inositol and thiamine. The other strain, isolated from a child, has complete deficiency only for DL-inositol.

Consequently, the authors think that vitamin requirements cannot be useful for the identification of the species. It is also emphasized that the results of this kind of research must be attributed to the strain assayed and not to the species. Many nutritional varieties may be distinguished within a species.

The three ectothrix, large-spored (megasporic) trichophytons of Sabouraud named *T. album*, *T. discoides*, and *T. ochraceum*, may be considered as synonyms, but botanical, clinical, and epidemiological facts demonstrate that they are quite different from *Trichophyton* (*Achorion*) *schönleini*, the agent of tinea favica.

FOWLE, L. P., & GEORG, L. K. (1947.) **Suppurative ringworm contracted from cattle.**—*Arch. Derm.* **56.** 780–793. [Abst. in *Bull. Hyg., Lond.* **23.** 330. (1948), copied *verbatim*. Signed: J. T. DUNCAN.] **2109**

An interesting report on 23 cases of suppurative ringworm of man caused by *Trichophyton discoides*, *T. album* and *T. mentagrophytes*, parasites of cattle and horses, in a farming community of central Pennsylvania. In 7 cases, the disease took the form of parasitic sycosis of the beard area and in one patient the lesions, unusually severe and extensive, were accompanied by constitutional symptoms and leucocytosis. There were 7 cases of kerion affecting the scalp in children and the face and post-cervical region in adults. Three of the children had contracted the infection from human sources and not directly from the animal host. Agminate folliculitis chiefly on the wrists or forearms, occurred in 14 patients, 5 of whom had also kerion or sycosis. The causative fungi were: *T. discoides* in 6 cases of kerion, 6 of

agminate folliculitis and 4 of parasitic sycosis; *T. album* in one case of parasitic sycosis, and *T. mentagrophytes* in 3 cases of agminate folliculitis and 1 of parasitic sycosis. The source of the faviform species, *T. discoides* and *T. album*, was cattle which showed clinical ringworm: that of *T. mentagrophytes* was not traced, but this species also is a parasite of cattle, although it is found more frequently on horses.

Local fungicidal treatment was ineffective, except for very superficial lesions. For the deep suppurative lesions, sodium iodide intravenously and in large doses by the mouth, accompanied by manual epilation and drainage of the pustules, brought about cure in 4 to 6 weeks.

GLASS, F. A. (1948.) **Viability of fungus in hairs from patients with tinea capitis. I.** *Microsporon audouini.—Arch. Derm.* **57.** 122–124. [Abst. in *Bull. Hyg., Lond.* **23.** 330. (1948); copied *verbatim.* Signed: J. T. DUNCAN.] **2110**

In the recent extensive outbreaks of tinea capitis in great cities of the United States, *Microsporum audouini* has been responsible for 80 to 100 per cent. of the infections, but in pre-war years the few and rather sporadic infections were caused in about equal numbers by *Microsporum lanosum* (*M. canis*) and *M. audouini.* The author considers that barbers' shops, the backs of cinema seats etc. may play an important rôle as vehicles of infection in the epidemics and in this indirect mode of transmission the capacity of the spores to survive on the shed hairs would be an important factor. An examination was therefore made, by sowing fragments of hairs, which had been stored for various periods, on culture media to determine the time of survival of the spores. Out of 18 specimens of hair infected with *M. audouini*, 9 yielded cultures, the most recent specimen with viable spores being 190 days old, and the oldest 460 days; but of 22 specimens infected with *M. lanosum* (*M. canis*) only 2 yielded cultures; one of these was a specimen 316 days old, and the other 366 days. From these results the author concludes that the spores of *M. audouini* on shed hairs have a longer period of viability, and therefore infectivity, than those of *M. lanosum.*

[The author's observation is important, but the test should be repeated with much larger numbers of infected hairs, and care should be taken that the ages of samples in the two series approximate more closely than was the case in the test recorded. Account should be taken of the state of the external spore sheath which may be very abundant on one hair sample and, from rubbing off, almost entirely deficient on another.]

HÜLPHERS, G., & LILLEENGEN, K. (1947.) Mögelsvampsinfektion, aspergillos, hos hare och vilt levande fågel. **[Aspergillosis in hares and wild birds.]**—*Svensk VetTidskr.* **52.** 235–239; & 243–262. [English summary slightly amended.] **2111**

Among the material from game which has been sent to the Bacteriological Section of the Veterinary College aspergillosis has been discovered in 9 hares, 20 capercailzie, 3 blackcock, 1 bastard tetraonid, 4 partridges, 1 ptarmigan, 2 pheasants, 2 mallards and 1 wood-pigeon. In all the cases the infection has been caused by *Aspergillus fumigatus.*

The morbid changes associated with aspergillosis in hares usually appear in the lungs. At the *post mortem* examination one commonly finds in the lungs numerous scattered foci the size of a pin's head. These foci are of a light-grey to grey-white to yellow-white colour. In other cases the foci are larger, frequently merging into one another, thus forming large confluences. In the lungs one sometimes finds encapsulated abscesses with thick pus. Changes may also occur in the kidneys, manifested in well encapsulated abscesses up to the size of a walnut, with a grey content, or the normal tissue of the kidney may be displaced by such foci up to the size of a walnut, consisting of a light yellow, rather tough caseous substance.

In wild birds the morbid changes associated with aspergillosis usually occur in the lungs, trachea and air-sacs, more seldom in the intestine. At times the changes appear most distinctly in the lungs. They sometimes manifest themselves in yellowish or grey, isolated nodules, sometimes in a diffuse congestion of the lungs, the congested parts containing more or less numerous foci. At other times the changes occur in the upper air-passages. These are filled with yellow fibrin masses. The membranes of the air-sacs are in some places coated with a layer of dirty yellow fibrin. In aspergillosis of the intestine there is an increase in the blood content of the intestinal wall and the mucosa is covered with numerous gangrenous membranes.

GINSBERG, A., & LITTLE, A. C. W. (1948.) **Actinomycosis in dogs.**—*J. Path. Bact.* **60.** 563–572. [Abst. from authors' summary.] **2112**

A Gram-positive aerobic organism was isolated from the seropurulent discharge from a throat sinus in a dog. The organism was found as a dense mycelium of acid-fast filaments which showed true branching; it proved highly pathogenic to rabbits. The simultaneous injection of penicillin and culture into rabbits neutralised the pathogenic effects of the organism. The organism closely resembled *A. asteroides.*

A second Gram-positive aerobic organism was isolated from a large granulomatous growth in the abdomen of a dog suffering from diffuse

peritonitis. This organism formed long filaments which showed true branching; it was non-acid-fast, liquefied Loeffler's serum and was non-pathogenic to laboratory animals. It was sensitive to penicillin *in vitro*.

KILHAM, L. (1947.) **Infection caused by *Streptobacillus moniliformis*. Report of 2 cases following rat bites.**—*New Engl. J. Med.* June 26th. 969–971. (1947.) [Abst. in *Bull. Hyg., Lond.* **22.** 669. (1947), copied *verbatim.*] **2113**

Two cases of infection with *Streptobacillus moniliformis* are reported. The simplicity of culturing this organism and of agglutination-tests is stressed. Penicillin was extremely effective in 1 case.

BESSEMANS, A., WITTEBOLLE, P., & BAERT, H. (1947.) Etude, par la micromanipulation, de la virulence d'un ou de plusieurs germes syphilitiques ainsi que de la vitalité des formes spirochetiennes ou granulaires d'une culture de prétendus tréponèmes pâles. **[A study, by means of micromanipulation, of the virulence of one or several spirochaetes as well as the viability of spirochaetal or granular forms of a culture of supposed *Treponema pallidum*.]**—*Soc. Belge Méd. Trop., Brussels.* Dec. pp. 81–98. [Abst. in *Bull. Hyg., Lond.* **23.** 548. (1948), copied *verbatim.* Signed: T. E. OSMOND.] **2114**

Earlier observers had found that in rabbit and mouse syphilis relatively large numbers of spirochaetes from a syphiloma, but very small numbers from a gland, are required to make a successful inoculation. Two theories were put forward to explain this: (1) that a syphilis virus, different from *Trep. pallidum*, combined with very few spirochaetes to make a satellite lymph gland highly pathogenic; and (2) in a syphiloma the defence mechanism rendered the spirochaetes much less virulent than those in a gland, which merely acted as a filter. These authors think the latter the more probable, since they found that in syphilomas the older the lesion the smaller the number of active spirochaetes, whereas spirochaetes obtained from glands were all very active. As a result of various experiments they had very few inoculation successes with cultured spirochaetes and found that (1) granules in cultures do not develop into spirochaetal elements, and to multiply in culture numerous motile spirochaetes must be present; (2) granules from syphilomas never caused a successful inoculation; (3) spirochaetes from human chancres usually proved infective even if only one organism was present; the same applied to rabbit syphilomas, though in both cases inoculation sometimes failed when many more were present; (4) much the same results were obtained with infected glands from hamsters: as a general rule, the smaller the number of infecting organisms, the longer the incubation period, this varying from 60 days with one organism to 25–30 with many. The fact that sometimes one spirochaete proves infective when many fail may be explained by the fact that all the organisms are not equally pathogenic. As a result of their observations, these authors conclude that the spirochaete does not adopt a viral or granular form, and stress the great virulence of organisms obtained from glands.

NELSON, R. A., Jr., & MAYER, M. M. (1949.) **Immobilization of *Treponema pallidum in vitro* by antibody produced in syphilitic infection.**—*J. exp. Med.* **89.** 369–393. [Author's summary slightly amended.] **2115**

Treponema pallidum was extracted from rabbit testicular syphilomas and suspended in a special medium in which the organisms remain motile and infectious for several days. On incubation of such suspensions with syphilitic rabbit or human sera and guinea pig complement, the treponemes became non-motile and lost their capacity to infect rabbits. Various factors affecting this immobilization have been investigated.

In a preliminary survey of individual sera, immobilizing antibody could be detected in the majority of sera from syphilitic animals and human beings, but was absent in almost all the normal sera examined. It could be demonstrated that the immobilizing and reagin activities of syphilis sera are due to separate antibodies.

BERNKOPF, H., & LITTLE, R. B. (1948.) **Comparison of New Jersey and Palestine strains of bovine leptospira.**—*Proc. Soc. exp. Biol. N.Y.* **69.** 503–506. [Authors' summary copied *verbatim.*] **2116**

A study has been made of strains of leptospira recovered from an outbreak of leptospirosis among cattle in New Jersey and a strain isolated from an outbreak of the disease in Palestine. Sera from recovered cattle as well as sera from immunized rabbits were used in agglutination and lysis tests and it was found that all the New Jersey strains reacted alike while the Palestine strain belonged to another serological group.

SCHACHTEL, J. (1948.) **An epidemic of leptospirosis bovis in men.**—*Harefuah.* **34.** 81–83. [English summary slightly amended.] **2117**

There has been an epidemic of 9 cases of bovine leptospirosis in human beings in 3 adjacent agricultural settlements in the Upper Hule area, 8 within one month, the 9th three months later. One patient developed very severe jaundice while the temperature was already declining; the others were milder cases, even though in the beginning the symptoms were severe.

The following symptoms were noticed in the milder cases: Fever, general marked lassitude, a light leucocytosis in the blood, increased blood sedimentation rate, albumen, casts and leucocytosis in the urine. The blood urea was increased in 6 cases. Pains in the muscles, conjunctivitis, nausea and vomiting occurred in 7 cases, tenderness in the right hypochondrium in 5 cases, tenderness round the kidneys in 3 cases, epistaxis in 2 cases; in only one case signs of meningitis were found, and one patient had a sugillatio under the conjunctiva.

It was found that only the one patient suffering from jaundice worked in a cowshed; the others (two of them women) had no close contact with cows in their work. In all 9 cases agglutinins for *Leptospira bovis* were detected.

All patients recovered. The one suffering from jaundice and 4 of the milder cases were treated with penicillin.

It is suggested that in pyrexia of unknown origin without jaundice the possibility of *L. bovis* should be considered.

CARGILL, W. H., Jr., & BEESON, P. B. (1947.) **The value of spinal fluid examination as a diagnostic procedure in Weil's disease.**]—*Ann. intern. Med.* **27.** 396–400. [Abst. in *Bull. Hyg., Lond.* **23.** 329. (1948), copied *verbatim.* Signed: J. C. BROOM.] **2118**

Abnormalities in the constitution of the cerebrospinal fluid have often been noted in cases of Weil's disease, even when meningitis is not an outstanding symptom. The authors found changes in the cerebrospinal fluid of 13 out of 14 cases, although only 6 presented clinical evidence of meningeal irritation. The cell count was increased in 12 cases; it varied between 17 and 740 per cmm.; lymphocytes predominated; the greatest increase occurred between the 5th and 9th days of illness. Xanthochromia was present in 12 cases, but all these patients were jaundiced, and the sign was absent in anicteric cases.

In other diseases associated with jaundice, however, the spinal fluid is colourless except when the jaundice is severe and of long duration. Xanthochromic spinal fluid in a patient with mild jaundice may be a point in favour of a diagnosis of Weil's disease.

The other tests used, namely pressure, total protein, Pandy's test and mastic curves, gave no useful information.

BORST, J. G. G., RUYS, A. C., & WOLFF, J. W. (1948.) Een geval van leptospirosis ballum. [**A human case of infection with** *Leptospira ballum.*]—*Ned. Tijdschr. Geneesk.* **92.** (iii). 2920–2922. [English summary copied *verbatim.*] **2119**

Description of the first case observed in man of leptospirosis ballum, caused by a light skin injury by a mouse that excreted large quantities of these leptospirae in its urine. Of the mice colony used 28 out of 30 adult animals appeared to have been infected spontaneously with these leptospirae.

[This strain was first described by BORG PETERSEN, *Acta path. microbiol. scand.* **21.** p. 594. (1944) from a mouse in South Jutland.]

See also absts. **2199** (salmonella strains); **2241** and **2242** (bacterial flora of alimentary tract); **2250** (pneumonia in pigs); **2291** to **2299** (meat inspection); **2326** (technique); **2344** (annual review of microbiology).

DISEASES CAUSED BY PROTOZOAN PARASITES

LALL, H. K. (1947.) **Geographical and seasonal incidence of surra in Punjab.**—*Indian J. vet. Sci.* **17.** 201–207. **2120**

L. analysed the data of surra cases in the Punjab from 1932–44. Regarding seasonal incidence he concluded that there was no quantitative relationship between the incidence of surra and the annual rainfall and that incidence of the disease always increased after rainfall. Winter rainfall was found to have no correlation with the incidence of surra.

The number of outbreaks per 10,000 of the equine and camel population was examined and a map prepared on this basis indicating the local distribution of surra within the province. An extensive low-lying area is shown to be a deciding factor in the distribution of surra within the province; for instance, few cases are encountered in the dry climate of Multan (three per 10,000) as compared with that of Ambala and Lahore where the climate is more humid and there are extensive low-lying areas. Again, although the total rainfall in Lahore, Rawalpindi and Ambala divisions is approximately the same, there is a difference in the number of cases in each division (Lahore 54, Rawalpindi 8, Ambala 59 per 1,000 respectively). Jullundur which has a heavier rainfall has an incidence rate of only seven per 10,000. The need for prophylactic treatment for one or two months following the summer monsoon is emphasized.—H. N. RAY.

I. KRANEVELD, F. C., & DJAENOEDIN, R. (1948.) Proeven over den duur der besmettelijkheid van met naganol en arsocoli behandelde surralijders. [**Duration of infectivity of horses after treatment for surra with naganol.**]—*Ned.-ind. Bl. Diergeneesk.* **55.** 3–27. [Abst. from English summary.] **2121**

II. KRANEVELD, F. C., & DJAENOEDIN, R. (1948.) Het effect van een prophylactische injectie van

naganol bij paarden tijdens het incubatie-stadium van surra. [**Effect of naganol in horses injected during the incubation stage of surra.**] —*Ibid.* 57–73. [Abst. from English summary.] **2122**

I. The blood of horses infected with 14 different strains of *Trypanosoma evansi* was free from trypanosomes from four to seven and three quarter hours after treatment with naganol and atoxyl.

In 20 out of 38 cases inoculation with two ml. of blood drawn as early as five min. after treatment did not produce surra in g. pigs. In some cases the blood remained infectious for three and three quarter hours.

Horses should be kept free from flies for at least six hours following treatment.

II. *Trypanosoma evansi* infection was checked in eight out of ten horses, weighing 145–170 kg., infected with a virulent strain and given one g. of naganol 1–5 days after infection. Two horses died during the experiment.

Similar results were obtained with four newly isolated strains. Naganol was given on the same day that trypanosomes were demonstrated microscopically in the blood.

In one of two horses infected with a fifth strain and treated similarly, trypanosomes reappeared in the blood after 50 days. It was found that the drug resistance of this relapse strain was slightly higher than that of the original parasites.

Two out of three horses infected with the relapse strain and treated with 3 g. of naganol and 3 g. of atoxyl died of surra; the remaining animal recovered.—E. G.

Romaña, C., & Gi, J. (1947.) Xenodiagnostico artificial. [**Artificial xenodiagnosis. *Trypanosoma cruzi* infection.**]—*An. Inst. Med. Regional.* **2.** 57–60. **2123**

The suspected blood, defibrinated or citrated, is placed in a test tube which is closed by a piece of the skin of a recently killed laboratory animal. *Triatoma* contained in another test tube are allowed to feed on the suspected blood in the first tube through the skin which covers it. The *Triatoma* are examined 1–2 months later and in this way positive diagnosis has been made in suspected cases.

Muniz, J., & Azevedo, A. P. (1947.) Novo conceito da patogenia da "doença de Chagas" ("Trypanosomiasis Americana"). Inflamação alérgica granulomat ide (A), e miocardite hiperérgica (B), produzidas em "Rhesus" ("Macaca mullata"), inoculados com formas mortas de cultivo do "Schizotrypanum cruzi". (Nota prévia.) [**New conception of the pathogenicity of Chagas's disease.**]—*Hosp., Rio de J.* **32.** 165–183. [Abst. in *Trop. Dis. Bull.* **45.** 416. (1948), copied *verbatim.* Signed: C. N. Wenyon.] **2124**

The authors have studied the pathogenicity of *Trypanosoma cruzi* by sensitizing two monkeys by intravenous injections of a protein-free antigen and then administering a shock injection. The antigen was prepared from cultures grown on solid medium. After the flagellates were washed with saline solution they were dried at a temperature of –70°C. They were kept dry at a temperature of –10°C. or in suspension in distilled water.

To carry out the test, two rhesus monkeys received five intravenous injections of the antigen at intervals of 3 days, two of the injections being 0·040 gm. and three 0·045 gm. Twelve days after the last injection, a shock injection of 0·010 gm. of antigen was given directly into the pleura and the cardiac region. One of the animals was given three further injections of the sensitizing antigen. One of the monkeys was killed eight days after the shock injection and the other 33 days after. Before being sacrificed, both monkeys gave ++++ precipitin reaction according to the method of Muniz and Freitas. As controls, two monkeys were given injections of antigen without a shock injection.

Examination of the pleura and cardiac tissues of the monkeys showed that inflammatory reactions were set up, there being a similarity of the histopathological picture to the lesions in Chagas's disease. In the control monkeys, such lesions did not occur. The experimental result supports the conclusion of Torres that there is an allergic condition in the pathogenesis of the disease.

Archetti, I. (1940.) Distribuzione e diffusione delle leishmaniosi nell' Africa Orientale Italiana. [**Distribution and diffusion of the forms of leishmaniasis in Italian East Africa.**]—*Riv. Biol. colon.* **3.** 401–418. [Abst. in *Rev. appl. Ent.* Ser. B. **36.** 23. (1948), copied *verbatim.*] **2125**

This is a review of the literature on the occurrence of various forms of leishmaniasis in Somalia, Eritrea, Abyssinia and neighbouring territories. It is shown that visceral leishmaniasis definitely occurs in the Anglo-Egyptian Sudan, Kenya, Somalia and Arabia (Aden and Yemen), cutaneous leishmaniasis in the Sudan, Kenya, Abyssinia, Eritrea and Yemen, muco-cutaneous leishmaniasis in the Sudan, Abyssinia, British Somaliland and Yemen, and leishmaniasis in dogs in Eritrea. It is concluded that visceral leishmaniasis is endemic in Somalia and Eritrea, that dogs are a reservoir in Eritrea, and that foci occur along the border with the Sudan. Notes are given

on the occurrence of *Phlebotomus* in the Sudan, Aden, Somalia and Eritrea, together with a list of seven species that have been recorded from Abyssinia and are known or thought to feed on man, and a map showing the distribution of *Phlebotomus* and of recorded cases of leishmaniasis in the whole of the area considered.

VANDEPLASSCHE, M. (1946.) Het bestrijden van de trichomonas-infectie bij stieren. **[The control of *Trichomonas* infection in bulls.]**—*Vlaam. Diergeneesk. Tijdschr.* **15.** 1–10. [English, French & German summaries. Abst. from English summary.] **2126**

Prophylactic and therapeutic treatments of trichomoniasis in bulls are described. Infected bulls were anaesthetized and the penis and prepuce washed with a chloramine-lugol solution. An antiseptic ointment, bovoflavine, was applied inside the sheath. Prophylactic treatment consisted of application of antiseptic solutions and ointments after each service.

Trichomoniasis was diagnosed by microscopic examination of the saline washings from the sheath.—E. G.

MAREK, K. (1945.) Rzęsistek bydlęcy jako przyczyna niezacielania i wczesnego ronienia u bydła w województwie krakowskim. **[*Trichomonas foetus* infection in Cracow.]**—*Med. Wet.* **1.** 143–147. [French summary.] **2127**

The methods of diagnosis and treatment of trichomoniasis in cattle are discussed.

M. believes that the disease had been introduced into Poland by cattle from foreign Western European countries during and after the war.

—E. G.

VANDEPLASSCHE, M. (1944.) Het verloop van een Trichomonas-epizootie bij runders, en hare bestrijding. **[The course and control of *Trichomonas* infection in cattle.]**—*Vlaam. Diergeneesk. Tijdschr.* **13.** 1–15. [English, French and German summaries. Abst. from summaries.] **2128**

Four bulls infected with trichomoniasis were treated for five months with bovoflavine ointment applied inside the prepuce every third day. All recovered.—E. G.

KEIDEL, H. J. W., SÖTMOLLER, P., & VAN NIE, C. J. (1948.) Een electieve voedingsbodem voor het aantonen van Trichomonas gallinae in geringe hoeveelheden. **[An effective nutrient medium for demonstrating *Trichomonas gallinae* in small quantities.]**—*Tijdschr. Diergeneesk.* **73.** 777–781. [Abst. from English summary.] **2129**

The authors describe a new medium used for growing trichomonads *in vitro*. Penicillin is added to amylated liver broth; the medium thus obtained promotes the growth of trichomonads without excluding the development of certain bacteria. This new medium might be of use in the diagnosis of trichomoniasis.—E. G.

HAWKING, F., & PERRY, W. L. M. (1948.) **Resistance to proguanil (paludrine) in a mammalian malaria parasite.**—*Lancet.* **255.** 850. [Authors' summary copied *verbatim*.] **2130**

A strain of monkey malaria (*P. cynomolgi*) has been subjected to repeated subeffective treatment with paludrine. After fourteen months its resistance to paludrine has increased about 1000 times, so that doses approaching the maximum tolerated one are only partially effective.

In view of the close similarity between *P. cynomolgi* and *P. vivax*, it seems probable that benign tertian malaria in man might become resistant to paludrine, though this process would probably take a long time to complete even under favourable conditions.

GRAMICCIA, G., & SACCÀ, G. (1947.) Note sulla infezione da *P. gallinaceum* nel pulcino. Considerazioni sul significato biologico del ciclo endoistiocitario dopo inoculazione di sangue. **[Biological significance of exoerythrocytic cycle of *Plasmodium gallinaceum* in young chicks.]**—*Riv. Parassit.* **8.** 213–219. [Abst. in *Trop. Dis. Bull.* **45.** 408–409. (1948), copied *verbatim*. Signed: C. M. WENYON.] **2131**

The inoculation of young chicks 5–8 days old with blood infected with *P. gallinaceum* produces a more severe infection than when adult chickens are inoculated. The young chicks first show exoerythrocytic forms on the 11th day of the blood infection, which is always fatal. The author interprets this period of eleven days as a cycle wherein the parasite attempts to repeat those phases that were omitted because of the method of inoculation. In the case of *P. elongatum*, blood inoculation is followed at the same time by both erythrocytic and exoerythrocytic development, while in the case of gametocytes these appear after a number of erythrocytic cycles.

YOELI, M. (1948.) **Antigens common to *Plasmodium* and *Haemoproteus*.**—*Amer. J. trop. Med.* **28.** 387–393. **2132**

The serological relationships of *Plasmodium* and *Haemoproteus* were studied by the complement-fixation test. Pigeons naturally infected with *H. columbae*, chickens infected in the laboratory with *Pl. gallinaceum* and a monkey chronically affected with *Pl. cynomolgi* were used. Antigens prepared from *Pl. gallinaceum* and *H. columbae* gave specific and group reactions. Cross reactions between the two genera were demonstrated.

—M. C.

SPLITTER, E. J. (1949.) **Anaplasmosis treatment**

with paludrine—a case report.—*J. Amer. vet. med. Ass.* **114.** 224–225. **2133**

Three experimentally infected calves were treated with paludrine. The drug was given intravenously in a 1% solution in doses varying from 6 mg. per kg. per day to 20 mg. per kg. per day. In some cases the intravenous dosage was supplemented by oral administration. In one of the three treated calves the number of circulatory anaplasma was reduced following the paludrine treatment, but this effect could not be reproduced in the other two calves. There was no evidence of prophylactic value in another experiment on one calf.—M. C.

SPENA, A. (1947.) Contributo allo studio della toxoplasmosi e considerazioni sulle diverse specie che constituiscono il genere *Toxoplasma.* **[Species of *Toxoplasma.*]**—*Riv. Parassit.* **8.** 85–104. [Abst. in *Trop. Dis. Bull.* **45.** 212–213. (1948), copied *verbatim.* Signed: C. M. WENYON.] **2134**

Toxoplasmosis was observed in laboratory guineapigs in Addis Ababa. The infection was inoculable from guineapig to guineapig, as also to the rabbit and a calf. The parasites occurred in all the organs. The author discusses the identity of the parasite in relation to *Toxoplasma caviae* Carini and Migliano, 1916, and concludes that it is better to consider that a single species exists which would be *T. gonadii* Nicolle and Manceaux, 1919.

HÜLPHERS, G., LILLEENGEN, K., & RUBARTH, S. (1947.) Toxoplasmos hos hare och tjäder. **[Toxoplasmosis in hares and a capercailzie.]** —*Svensk VetTidskr.* **52.** 295–332. [English summary slightly amended.] **2135**

After a survey of the toxoplasms and their occurrence in general, the authors describe 27 cases of toxoplasmosis in hares (*Lepus europaeus et L. timidus*). These cases are described from material from 840 hares. The dead animals had as a rule been found on open fields in south and central Sweden. Their state of nutrition was, generally speaking, satisfactory; many of them, however, showed signs of general disturbances of the circulation, with hyperaemic lungs, liver and spleen as well as stasis transudate in the serous cavities. The mesenteric lymph-glands were enlarged and wholly or partly necrotic, and the liver in some cases showed numerous large or small greyish-yellow foci.

The histological examination of the liver as a rule showed necrosis with a reticular structure and without a distinct localization in the lobuli. In many cases, the mesenteric lymph-glands were necrotic, and in the intact lymph-gland tissue as well as in the periglandular inflammatory connective tissue, intracellular accumulations of toxoplasma were found in abundance.

All attempts at transmission have failed, presumably owing to the fact that the material was too old. All the animals were found during the cold season of the year.

The authors also give an account of a case of toxoplasmosis in a capercailzie (*Tetrao urogallos*), which on autopsy showed acute meningoencephalitis with, among other lesions, granulomas and calcification in the brain, thus presenting a similar picture to that found in man. Multiple acute myocarditis was present. In this case the toxoplasma showed more distinctly marked nuclei than in the hare material.

See also absts. **2196** (amoeba); **2328** (technique).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

HAGAN, W. A. (1948.) **The necessity for research on foot-and-mouth disease.**—*J. Amer. vet. med. Ass.* **112.** 327–331. **2136**

The occurrence of F. & M. disease in Mexico in 1946 and its spread since then has been a cause of concern to the U.S.A. authorities and has emphasized the need for research into this disease. An advisory committee has suggested the sending of American scientists to laboratories in Europe to study vaccine production and has also recommended that a laboratory be built in America. Plans are now being made for a laboratory to be established within an area of 600 acres surrounded by a high fence. Inside this area will be a compound 40 acres in area surrounded by a rodent-proof concrete wall sunk into the ground and rising six feet above it. It had been suggested that the laboratory be built on an island, but this was rejected on account of operational difficulties. No decision has yet been made as to the exact site, but Long Island in New York State is considered to have many advantages.—M. C.

ANON. (1948.) **Foot-and-mouth disease situation.**—*J. Amer. vet. med. Ass.* **112.** 332–337. **2137**

A 90-mile barbed wire fence is under construction on the eastern part of the northern quarantine line on the U.S.A.-Mexican frontier. Vaccination has been started with vaccine purchased from Argentina. Mexican viruses have been typed at Pirbright in England and will be used by various European laboratories to prepare vaccine.—M. C.

CLARKSON, M. R. (1948.) **Foot-and-mouth disease activities and policies.**—*J. Amer. vet. med. Ass.* **113.** 423–427. **2138**

A short review of the threat of F. & M. disease to livestock in the U.S.A. A description is given of the problem facing the U.S. Department of Agriculture's Bureau of Animal Industry in keeping their country free from the disease, particularly with reference to the epizootic in Mexico.—W. M. HENDERSON.

MOOSBRUGGER, G. A. (1948.) Recherches expérimentales sur la fièvre aphteuse. Compte rendu de quelques travaux effectués dans l'institut vaccinal de Bâle au cours des années 1945 à 1947. [**Foot and mouth disease. (Work of the Federal Institute at Basle.)**]—*Schweiz. Arch. Tierheilk.* **90.** 176–198. [In French.] **2139**

This paper summarizes the results of a number of investigations conducted at Basle. The antiseptic action of anisol was found to be superior to that of formalin in aluminium hydroxide F. & M. disease vaccine. The development is described of vesicular lesions on the hands and feet of a butcher employed in the slaughtering of infected cattle, but inoculation of four g. pigs and two cattle with vesicular lymph from this man failed to produce the disease. A calf, four months old, was kept in the virus production building for over a month before becoming infected through directly contaminated hay; this fact is taken as evidence that air and dust play no part in the transmission of the disease. An attempt to conserve aluminium hydroxide vaccine by freeze-drying resulted in the recovery of active virus from the dried material. From chemical investigations of the formalin content of the vaccine it was found that glycocoll, besides acting as a buffer also bound formalin. 3,000,000 units of penicillin given intramuscularly to five cows about two hours before inoculation with virus had no influence on the course of the disease.—W. M. HENDERSON.

SÁNCHEZ, F. F. V. (1945.) Virus y vacuna de glosopeda en España. [**Foot and mouth virus and vaccine in Spain.**]—*Trab. Inst. Bio. anim., Madr.* **8.** 321–404. **2140**

S. gives a general summary of present-day knowledge about the virus, together with some of his own findings. Statistical tables of the infection in Spain are given, with a hypothesis for its starting point (the Pyrenees). An interesting observation is made: that the epizootic curve starts going up in the spring, attains its maximum in the summer and its minimum in the autumn and winter.

S. describes the methods followed for isolation and typing of the virus: cross immunity tests in g. pigs and in cattle. The so-called "Canillas I" type is identified with the "A type" virus and "Canillas II" with "B type". Another strain of virus (unnamed) is identified with "C type". Complement fixation is also used for typing the virus and is considered by S. to be the most reliable method. The use of convalescent serum is discarded as practically worthless. The use of Waldmann's vaccine is advised. S. used it experimentally in Spain with only 0·059% of infection. Its effective period is given as between 6 and 12 months.—F. A. ESTEVES.

TRAUM, J. (1948.) **Foot and mouth disease with special reference to its communicability to man.**—*Bol. Ofic. sanit. panamericana.* **27.** 356–365. [Abst. in *Bull. Hyg., Lond.* **23.** 956. (1948), copied *verbatim.* Signed: R. LOVELL.] **2141**

Foot and mouth disease is highly contagious and attacks practically all cloven-footed animals; other animals and man are rarely affected. The guineapig is the most susceptible laboratory animal; hedgehogs may also be infected and readily transmit the disease to each other by contact. The virus is rather resistant and may persist in the field for long periods. A two per cent solution of sodium hydroxide is efficient as a disinfectant. The common agent in the spread of the disease is the infected animal, and meat scraps, bone and other parts from infected animals can be a source of infection especially in garbage given to pigs. Human beings may convey the virus mechanically on the clothing and person.

In man, the disease is extremely rare and there are probably not more than 20 to 25 proven cases. The period of incubation is from two to five days and the disease begins with fever and headache; vesicles form on the skin of the palm of the hand, on the sole of the foot, on and between the fingers and toes, and around the nails. The vesicles rupture and leave eroded surfaces which heal rapidly; as a rule there is no scar formation unless secondary infection sets in. The intracutaneous injection of fluid or coverings of the vesicles, not more than two days old, into the hind foot pads of guineapigs should induce primary vesicles at the site of inoculation within 24 to 48 hours; secondary vesicles appear on the hairless surfaces of the front feet and sometimes on the tongue 24 to 48 hours later.

The viruses of herpes simplex and variola also produce lesions in guineapigs but they are more diffuse and oedematous, with a tendency to become purulent without secondary involvement.

Foot and mouth disease is of no great importance in man even in those countries where it is prevalent in animals; transference from man to man has not been reported.

FINZI, G. (1948.) Sur l'emploi du sérum hyperimmun dans le traitement de la fièvre aphteuse. [**Hyperimmune serum treatment of**

foot and mouth disease.]—*Rev. Méd. vét., Lyon et Toulouse.* **99.** 362–368. **2142**

Discussing the fact that hyperimmunization of cattle for the production of F. & M. disease antiserum does not always provide a product much more active than convalescent serum, F. suggests that there is a "limit of immunity". This limit may be reached in some cattle following natural infection and additional antigenic stimuli will not increase the protective properties of their sera, whereas in other cattle a series of stimuli are required for the limit to be reached. This limit will also vary from individual to individual. Ramon's work [*V. B.* **14.** 7.] on the production of an antiserum from the horse suggests that the limit may be higher in this species than in cattle even although the horse is not susceptible to the disease.

In F.'s opinion the use of serum can play a useful part in control of the disease especially by its administration to the remaining healthy cattle on an infected farm when use of vaccine would not give a sufficiently rapid protection.—W. M. H.

MANCINI, A. (1947.) La aftosa y su profilaxis. [**Immunization against foot and mouth disease.**] —*Rev. Fac. Med. Vet. Lima.* **2.** 9–15. **2143**

A short review giving no new information. —W. M. HENDERSON.

LECOMTE, E., & LECOMTE, G. (1948.) Etude comparée des vaccins antiaphteux de Belin et de Waldmann. [**Trials of the Waldmann and the Belin foot and mouth disease vaccines.**]—*Encyclopéd. vét. périod.* No. 1–2. pp. 61–66. **2144**

Judging on field experience in Northern France in 1946 the authors concluded that Belin's vaccine (1,177 cows, 202 calves and 152 pigs vaccinated) was superior to the Waldmann type vaccine (242 cows, 211 calves and 12 pigs vaccinated).—W. M. HENDERSON.

PARRAT, J. (1948.) Etude de quelques facteurs influençant le développement des aphtes lors de l'inoculation artificielle des animaux destinés à la production de vaccin antiaphteux. [**Factors influencing development of foot and mouth disease lesions in cattle inoculated for the production of vaccine.**]—*Schweiz. Arch. Tierheilk.* **90.** 9–29, 80–96. [In French.] **2145**

Interesting and valuable analyses have been made of the data concerning the tongue inoculation and collection of vesicular epithelium and lymph from 4,220 donor cattle during the production of 54,888 l. of F. & M. disease vaccine over a period of some four years at the Swiss vaccine production Institute, Basle. The conclusions reached as a result of these analyses can be summarized under three heads: (1) Factors tending to decrease the yield of infective material. (a) Extrinsic. These are the use of a non-isotonic and non-buffered solution or the use of inadequate buffer or a pH markedly different from 7·6 for preparation of the inoculum, the making of a small number of intradermal injections on the tongue, killing the cattle before the optimum 24–26 hours after inoculation. It is felt that climatic conditions may play some part, particularly a low ambient temperature, but insufficient observations are available for a definite conclusion. (b) Intrinsic. A small tongue with thin mucosa naturally reduces the yield. Smaller yields were also obtained from pigmented tongues. Immunity was met in 1% of the animals, presumably due to previous vaccination. An attempt was made to correlate the presence of disease with yield, poor general condition gave low yields, but no particular infection was specifically responsible. (2) Factors augmenting the yield. A virulent, stable, good lymph-producing strain of virus, the use of lymph rather than epithelium for preparation of the inoculum and a study of the passaging of the strain to preserve material giving the best results. (3) Factors having no apparent effect. Breed, sex and weight of the animal commensurate with the size of the tongue.—W. M. HENDERSON.

I. BELIN, M. (1948.) Contribution à l'étude de l'immunité conférée par les complexes vaccino-aphteux formolés. [**Immunity conferred by formolized vaccinia—foot-and-mouth disease virus complex (Belin vaccine).**]—*Bull. Acad. vét. Fr.* **21.** 371–374. **2146**

II. BRUN, M. (1948.) Le vaccin anti-aphteux Belin en pratique rurale algérienne. [**Use of the Belin vaccine for foot and mouth disease in Algeria.**]—*Ibid.* 375–380. **2147**

I. Two heifers, six months old, were vaccinated subcutaneously with 30 ml. of a bivalent Belin vaccine. Twenty-nine days later one was inoculated on the tongue with F. & M. disease virus and well-developed vesicles appeared at the sites of inoculation, but no secondary lesions developed. The other animal's tongue was rubbed with a brush soaked in virus and left in contact with the reacting animal, but no lesions developed. Severe F. & M. disease is said to have occurred in the controls [numbers used and methods of exposure not stated].

Successful protection is claimed following use of the vaccine in the field, prominence being given to the vaccination of five cows, three calves and two bulls of local breed in Algeria with vaccine transported from Paris by air and rail. None of these cattle developed the disease when they were put in infected premises and this fact is taken as a demonstration of the stability of the vaccine even in, presumably, unsuitable storage conditions.

II. Following vaccination in Algeria with BELIN's vaccine of 1,309 cattle, 307 lambs and 342 pigs during an epizootic of F. & M. disease, B. concluded that this method of vaccination proved of some value although the immunity produced did not appear to last at an adequate level for more than two months.—W. M. H.

LEVADITI, C. (1943.) Quelques particularités de l'encéphalite provoquée chez la souris par la souche neurotrope du virus aphteux. **[Encephalitis in mice infected with neurotropic foot and mouth disease virus.]**—*C.R. Soc. Biol. Paris.* **137.** 346–347. **2148**

L. recognized a chronic and an acute form of encephalitis in his work with a neurotropic strain of F. & M. disease virus in mice (see also *V.B.* **13.** 208). In the chronic form the picture is similar to that in experimental lymphogranuloma inguinale; in the brain tissue there are areas of calcification and the ventricles are dilated. In the acute form there is marked lysis of the cerebral cortex.—H. H. SKINNER.

LUCAS, M. A. (1948.) L'augmentation du pouvoir pathogène du virus aphteux. **[Exaltation of virulence of foot and mouth disease virus.]**—*Bull. Acad. vét. Fr.* **21.** 123–131. **2149**

L. reports that the pathogenicity of a bovine strain of F. & M. disease virus was augmented one thousand times for g. pigs and one hundred thousand times for cattle following passage through pigs. These observations are based on titrations of infective material. The possible importance of these results is discussed from the epidemiological and immunological points of view.—W. M. HENDERSON.

SCHMIDT, S., HANSEN, A., & HOLM, P. (1949.) **Irradiation of foot and mouth disease virus with ultra-violet rays.**—*Acta path. microbiol. scand.* **26.** 354–358. [Authors' conclusions copied *verbatim.*] **2150**

The virus of foot and mouth disease, when irradiated with ultra-violet light under suitable experimental conditions, is transformed into a non-toxic modification (anavirus) which possesses distinct immunizing properties. This applies to both guinea-pig passage virus and cattle virus, and the virus behaves in practically the same manner whether we use a simple dilution in saline or an adsorbate. The immunizing properties of a detoxicated virus dilution can be intensified by adsorption to aluminium hydroxide.

Investigations are in progress regarding a comparison of the action of these vaccines with the action of formolized and heat-treated adsorbates, as well as experiments on perfecting the technique of irradiation.

SELLERS, T. F. (1948.) **Rabies, the physician's dilemma.**—*Amer. J. trop. Med.* **28.** 453–456. **2051**

This interesting account of the problems which the physician encounters when dealing with people who have been exposed, or fear that they may have been exposed, to risk of infection with rabies will be of value to veterinarians working in countries where the disease is common. Not infrequently the veterinarian comes into contact with the problem before it reaches the physician. S., as a result of 30 years' experience is of the opinion that rabies vaccine is not harmless and that it has caused more deaths than has rabies when given to persons only indirectly or remotely exposed. He therefore deprecates indiscriminate vaccination and would confine the use of the vaccine to those who are definitely at risk. Only those who have definitely been bitten or are suspected to have been bitten by the teeth of a rabid animal should be treated with vaccine. For any exposure other than bites vaccine should be refused. S. details rules to guide the physician in coming to a decision. These comprise rules for deciding whether the offending animal is rabid or not and then rules for deciding whether vaccine treatment is necessary. He sums up by saying that it is not hydrophobia but rather rabiphobia which is the most troublesome problem.—M. C.

KORNS, R. F., & ZEISSIG, A. (1948.) **Dog, fox and cattle rabies in New York State. Evaluation of vaccination in dogs.**—*Amer. J. publ. Hlth.* **38.** 50–65. **2152**

In recent years the fox has taken the place of the dog as the main source of rabies infection in New York State.

Statistics are quoted which indicate the value of prophylactic inoculation of dogs and it is considered that mass inoculation of dogs is a valuable adjunct to dog control measures. Rabies in cattle in New York State has generally been caused by the bites of rabid foxes. Control of foxes is being attempted by trapping.—M. C.

PAWAN, J. L. (1948.) **Fruit-eating bats and paralytic rabies in Trinidad.**—*Ann. trop. Med. Parasit.* **42.** 173–177. **2153**

Fruit-eating bats do not normally bite animals. The possibility that they may depart from their normal habit when infected with rabies has been investigated experimentally. It was found that while fruit-eating bats of the genus *Artibeus* are refractory to infection and may not manifest any evidence of disease, their saliva may carry infection. When infected with rabies they may bite animals. Field evidence indicates that bats of this genus may on occasion become infected and may bite animals and even man.

The vampire bat is the main danger, but fruit-eating bats may also be concerned in the spread of rabies. The average life of the bats after artificial infection was 180 days.—M. C.

TUNÇMAN, Z. M. (1946.) Isirilmadan husule gelmiş nadir bir insan kuduzu vak'asi. [**A rare case of rabies without a bite.**]—*Türk Tip Cemiyeti Mecmuasi.* **12.** 60–64. [English summary.] [Abst. in *Trop. Dis. Bull.* **46.** 189. (1949), copied *verbatim.* Signed: H. J. O'D. BURKE-GAFFNEY.] **2154**

A villager from Geyve killed a calf because it had all the signs of rabies. He developed rabies three months later. It is considered that he was infected through scratches on the right hand.

UNGARI, C. (1948.) Meningoencefalomielite da virus rabico a decorso clinico anomalo. [**Meningo-encephalitis due to rabies virus, having an atypical clinical course.**]—*Pediatria.* **51.** 52–58. [Abst. in *Trop. Dis. Bull.* **45.** 477. (1948), copied *verbatim.* Signed: G. STUART.] **2155**

The author refers to the difficulties experienced in deciding, when an acute ascending paralysis of the Landry type occurs at the end of or shortly after completion of anti-rabies treatment, whether it is a latent encephalomyelitis activated during the treatment, a paralytic accident of vaccine treatment or a case of rabies caused by street virus or fixed virus modified by vaccination.

A case of street virus infection which followed an atypical course is described:

A girl aged 7 years was bitten on the face by a stray dog, later confirmed by biological tests as having been rabid. Local disinfection was effected and anti-tetanus serum given within a few minutes; intensive anti-rabies treatment was commenced with Puntoni's phenolized vaccine within 48 hours. On the 21st day of treatment (28 days from the date of bite), the child suddenly developed high fever, followed two days later by signs of a paralysis which ascended from the lower limbs to the cranial nerves before death supervened on the 9th day of illness.

The main symptoms were those of paralysis with fairly well marked meningeal signs, itching in the bite scar and changes in the mental state (agitation, hallucinations, delirium). At no time was there hydrophobia or aerophobia, deglutition remaining comparatively unimpaired until death.

Histological examination of the brain revealed no Negri bodies, but the so-called Babes nodules were found in the superior olivary body.

Biological tests made on two guineapigs by the inoculation of bulbar material resulted in the death of the animals on the 18th day, with the presence of numerous and typical Negri bodies in the horn of Ammon. A second and third passage resulted in death of the test guineapigs on the 11th and on the 7th days respectively, with similar post mortem recovery of Negri bodies. The diagnosis of street virus was therefore established.

The difficulties of establishing a differential diagnosis on clinical grounds alone are discussed.

HABEL, K., & WRIGHT, J. T. (1948.) **Some factors influencing the mouse potency test for rabies vaccine.**—*Publ. Hlth Rep., Wash.* **63.** 44–55. **2156**

The causes of variation in results of potency tests of rabies vaccine were investigated. Factors influencing the test, such as the technician, the strain of mice and the strain of test virus were studied. It was demonstrated that different strains of Swiss mice varied in their ability to respond to immunization and that the invasiveness of the strain of test virus affected the results.

A standardized technique for the test was devised and is detailed in this paper.—M. C.

HARRIS, D. L. (1948.) **On the purification of rabies vaccine.** [**Correspondence.**]—*Science.* **108.** 158. **2157**

Rabies vaccines consist of a mixture of inert and of antigenic fractions. Removal of the inert fractions improves the potency of the vaccine. Fats and lipoids can be removed by extraction at low temperatures with a petroleum ether of low boiling point without destroying the virus or impairing its antigenic value.—M. C.

MUNRO, D. A. (1947.) **Protective inoculation with dry pigeon-pox and sheep and goat-pox vaccine.**—*Indian J. Vet. Sci.* **17.** 193–200. **2158**

The viability of sheep and goat-pox vaccine in a dry state was studied. Whereas the wet vaccine when stored at 42°F. was potent for only about a month, the dry vaccine was viable for not less than six months. At 98·6°F., however, the dry vaccine lost its potency within six months. Similar results were observed in the case of pigeon-pox vaccine. Only in 30–40% of the animals vaccinated was cross-immunity established against sheep-pox and goat-pox using the heterologous vaccine.—C. SEETHARAMAN.

FENNER, F. (1948.) **The clinical features and pathogenesis of mouse-pox (infectious ectromelia of mice).**—*J. Path. Bact.* **60.** 529–552. [Author's summary copied *verbatim.*] **2159**

The clinical features of naturally acquired mouse-pox are the primary lesion and the secondary rash. The development and appearance of these lesions and their histological features are described.

Growth curves were determined for two strains of ectromelia virus by daily titrations of

virus in the inoculated foot and in the spleen, blood and skin of mice infected with small doses of virus, and detailed qualitative studies were made of the times of appearance of virus in the regional lymph node, spleen and liver, and blood of infected mice. The results showed that ectromelia virus underwent a step-by-step invasion of the body via the regional lymph node to the liver and spleen, which were reached on the third day. Multiplication of virus in these organs caused a secondary viraemia, during which multiple foci of infection of the skin resulted in the development of the rash some days later. Signs and symptoms of infection never occurred before the virus concentration in the tissue or organ reached a level of about 10^7 infective particles per g.

The generation times of the two strains of virus in different tissues were determined from the growth curves. The late appearance of the primary lesion was due to the slow multiplication of virus in the same except in the spleen, in which the Moscow strain multiplied more than twice as fast as the Hampstead strain. This difference, which probably occurs in the liver also, is directly responsible for the higher virulence of the Moscow strain and indirectly for the greater severity of skin lesions in the survivors.

This study of mouse-pox has important implications in the field of the acute exanthemata of man.

ANON. (1948.) **Studies of the 1943 epidemic of influenza A. V. The distribution of influenza virus.**—*Amer. J. Hyg.* **48.** 292–304. [Summary copied *verbatim.*] **2160**

In a study of the distribution of influenza virus A during and after an epidemic, the agent was demonstrated only in throat washings from individuals who had some clinical evidence of respiratory illness and whose sera showed an increase in antibodies to influenza virus A. Examinations of washings from hospitalized patients and well soldiers lacking an antibody response uniformly failed to give evidence of the presence of the virus. The agent was detected in 28 of 46 patients whose illnesses were serologically diagnosed as influenza, and in 2 of 15 soldiers in the field whose sera showed an antibody response. There was no striking difference in the frequency of detection of virus in washings from individuals with a slight increase in antibody titer in comparison with those from subjects showing a marked increase in titer. Using embryonated eggs, virus was not detected in washings collected more than 6 days after the onset of illness. In contrast, evidence was obtained, by inoculation of animals, for persistence of virus in the throat for from 7 to 35 days after the onset of influenza. Acceptance of these results in animals, however, must depend on further confirmation, since the possibility of cross infection in some of them cannot be excluded.

HARRIS, S., & HARRIS, T. N. (1949.) **Influenzal antibodies in lymphocytes of rabbits following the local injection of virus.**—*J. Immunol.* **61.** 193–207. [Authors' summary copied *verbatim.*] **2161**

Following the injection of inactivated influenzal virus into the foot-pad of the rabbit antibodies to the viral protein can be found in the popliteal lymphnode, which drains the site of injection, and in lymph obtained from the efferent lymphatic vessel of that node. These antibodies are found earlier in the local lymphatic system than in the serum and in higher titer until the 4th day after the injection. Thereafter the serum-titer rises above that in the lymphatic tissues.

At the same time there is a burst of activity in the local lymphatic tissue. There is marked enlargement of the lymphnode, almost entirely of cortical tissue. This consists of diffuse lymphocytic hyperplasia which very soon becomes organized into the conventional follicular structure of lymphnodes. The absolute and relative count of lymphocytes in the lymph emerging from the popliteal lymphnode rises sharply.

Injection of serologically distinct strains of influenzal virus into the two legs of individual rabbits gives results which corroborate the specificity of the antibodies produced.

On separation of lymph emerging from the popliteal lymphnode into cells and plasma and testing each for antibody-content, it is found that the titer of antibody in the lymph-cells exceeds that in the lymph-plasma, by ratios as high as 16 : 1. This ratio is found to be highest at the time when the rate of increase of antibody-content of the local lymphatic system is greatest.

These findings are interpreted to mean that the lymphocyte can be a primary source, or site of final synthesis, of antibodies to viral protein. This conclusion is in keeping with those of earlier studies in which a similar role was demonstrated for the lymphocyte in the formation of antibodies to bacterial and cellular antigens.

STRAUB, M., & MULDER, J. (1948.) **Epithelial lesions in the respiratory tract in human influenzal pneumonia.**—*J. Path. Bact.* **60.** 429–434. [Authors' summary copied *verbatim.*] **2162**

The observations of Askanazy and of Winternitz *et al.* on epithelial lesions of the trachea and bronchi in cases of influenza occurring during the 1918 pandemic were confirmed to a certain extent in various cases of clinically suspicious influenzal pneumonia seen during the 1939–47 period, as well as in a case of virologically confirmed interpandemic influenza in 1941. A special autopsy

technique for the trachea and lungs in influenza, necessary for the demonstration of these lesions, is described.

The epithelial lesions, which are more or less identical with those described in mice and ferrets, consist in the disappearance of the goblet and ciliated columnar cells, the basal-cell layer being preserved and subsequently regenerating to a stratified (undifferentiated) epithelium. In all but one case the epithelium of the small bronchioles was found intact, even in a case where there was purulent bacterial bronchiolitis. This may constitute a difference from pandemic influenza, in which Winternitz *et al.* found necrosis of the bronchiolar epithelium also. The epithelial lesions now described are considered by the authors as being caused by the action of influenza virus. An alternative explanation of the epithelial lesions on the basis of bacterial toxic action cannot be completely refuted. Further combined virological, bacteriological and pathological investigations are necessary to determine the significance of these changes.

SUGG, J. Y., & MAGILL, T. P. (1948.) **The serial passage of mixtures of different strains of influenza virus in embryonated egg and in mice.**—*J. Bact.* **56.** 201–206. [Authors' summary copied *verbatim.*] **2163**

It was found that mixtures of some strains of influenza A and influenza B viruses could be passaged in series in embryonated eggs and in mice. In view of these results, it would seem likely that a combination of more closely related strains might be maintained indefinitely by the usual methods of laboratory cultivation. The data, therefore, raise the question of whether or not all strains of influenza virus are antigenically "pure," and indicate the desirability of obtaining more definite evidence of "purity" in the case of strains to be used in experiments on variation.

HENLE, W., & ROSENBERG, E. B. (1949.) **One-step growth curves of various strains of influenza A and B viruses and their inhibition by inactivated virus of the homologous type.**—*J. exp. Med.* **89.** 279–285. [Authors' summary copied *verbatim.*] **2164**

One-step growth curves of five strains of influenza A, one strain of swine influenza, and three strains of influenza B virus have been analyzed. The influenza A and swine influenza strains showed constant periods of 5 to 6 hours before newly formed virus was liberated from the infected cells, whereas 8 to 10 hours elapsed in the case of the influenza B strains.

The yield of virus in the allantoic fluids, *i.e.* the number of ID_{50} released for every ID_{50} of seed virus adsorbed, was consistently higher in the case of the influenza A and swine influenza strains than in that of the influenza B viruses.

Interruption of the cycle by injection of inactivated virus subsequent to infection can be achieved by any of the strains of the homologous type. However, cross-tests between influenza A and swine influenza virus led only to partial inhibition of virus growth.

KNIGHT, C. A. (1947.) **Amino acid composition of highly purified viral particles of influenza A and B.**—*J. exp. Med.* **86.** 125–129. [Author's summary copied *verbatim.*] **2165**

Microbiological assays for amino acids were made on hydrolysates of four to five highly purified preparations each of influenza A virus (PR8 strain) and influenza B virus (Lee strain). The results of the assays indicated that these strains of influenza virus contain approximately the same amounts of alanine, aspartic acid, glycine, histidine, isoleucine, leucine, methionine, phenylalanine, proline, serine, threonine, and valine. However, significant differences were found in the values for arginine, glutamic acid, lysine, tryptophane, and tyrosine. It is believed that these differences may provide, at least in part, a chemical explanation for some of the differing properties of the PR8 and Lee strains of influenza viruses.

GREEN, R. H., & WOOLLEY, D. W. (1947.) **Inhibition by certain polysaccharides of hemagglutination and of multiplication of influenza virus.**—*J. exp. Med.* **86.** 55–64. [Authors' summary copied *verbatim.*] **2166**

The complex carbohydrates apple pectin, citrus pectin, flaxseed mucilage, blood group A substance, gum acacia, and gum myrrh as well as an extract of RBC [red blood corpuscles], when examined in a pattern test, were shown to inhibit the agglutination of chicken RBC by influenza A virus. A number of other simple and complex carbohydrates showed no inhibitory effect. The hemagglutination-inhibiting action of apple pectin was examined in some detail and evidence was adduced to show that it affected both virus and red cell. Apple pectin was also found to inhibit the multiplication of influenza A virus in embryonated eggs.

CHADDOCK, T. T. (1947.) **Encephalitis in the fox and in the dog.**—*Vet. Med.* **42.** 475–478. **2167**

The specific virus infection fox encephalitis is described as experienced in natural outbreaks on fox farms. Recovered cases possess a good immunity and an efficient hyperimmune serum can be produced. This would be of use in acute outbreaks, though a safe vaccine has not been developed. The disease has a wide distribution over the U.S.A. in dogs and the incidence, although

unknown, is probably greater than has been previously realized. The differences in the form of the disease in foxes and in dogs are discussed. —K. G. Towers.

Davidson, F. A. (1948.) **The immunology and epidemiology of some virus diseases. [Rinderpest.] [Correspondence.]**—*Vet. Rec.* **60.** 44. **2168**

D. recalls that in 1922 in Hong Kong he used goats to produce rinderpest virus free from *Babesia* infection for use in the serum-simultaneous immunization of cattle. He had no difficulty in transmitting infection in goats; all the goats recovered after a typical thermal reaction. After a number of passages through the goat the virulence for cattle seemed to be attenuated, as evidenced by the difficulty experienced in judging the dose of serum necessary to prevent severe reaction but at the same time to permit of the development of a satisfactory immunity.—M. C.

Sergent, Ed. (1948.) Nécessité et efficacité de barrières sanitaires au Sahara. Deux exemples : la peste bovine et le baïoudh du dattier. **[Necessity and efficacy of quarantine barriers in the Sahara (rinderpest).]**—*Arch. Inst. Pasteur Alger.* **26.** 1–9. **2169**

Starting with the statement " La mer unit, le désert sépare " S. discusses how the Sahara desert has influenced the spread of rinderpest and of a disease of date palms. Rinderpest introduced into North Africa at Cairo from Russia in 1884 spread southwards and then westwards but, blocked by the Sahara, it never spread into Tunisia, Algeria and Morocco. The development of motor transport in recent years has made the desert a less effective barrier than in the past and S. considers the steps which are now necessary to protect Tunisia, Algeria and Morocco from infection.

He gives a useful list of species of domestic and wild animals known or suspected to be susceptible to the disease. He attaches great importance to the danger of introduction of infection by " healthy carriers " and recommends that the only safe measure is to prohibit importation of all living animals [he doubtless means all animals susceptible to the disease] into French North Africa from any other part of Africa. He states that history shows that once rinderpest is introduced into a country it becomes enzootic and cannot be eradicated. [This statement ignores the experience gained in France and Belgium, in Australia, in some of the islands of the Dutch East Indies, in Ceylon, in S. Africa, in Great Britain, in Brazil and in other countries.] —M. C.

Purchase, H. S. (1948.) Notes et renseignements sur l'état actuel des méthodes efficaces de prophylaxie de la peste bovine. **[Present methods of immunization against rinderpest.]** —*Bull. Off. internat. Epiz.* **30.** 5–11. **2170**

P. gave a short account of the relative merits of inactivated vaccines, goat-adapted, egg-adapted and rabbit-adapted virus vaccines. P. has had experience at Nanking with a rabbit-adapted virus which has had more than 800 passages in rabbits. It has given good results even in cattle imported from Europe.

The Indian [Mukteswar ?] strain of goat-adapted virus was too virulent for use on Siamese buffaloes. P. considered that an international centre for research into problems of rinderpest immunization is required.

In the discussion Mabrouck stated that in Egypt between May 1st, 1947, and April 20th, 1948, over 680,000 cattle had been vaccinated with a goat-adapted virus [origin of strain not stated]. There had been 789 deaths due to vaccination, *i.e.*, almost 0·1%. Cabot stated that rinderpest has been imported into Malta, but that the Colonial Office, London, now reported that it had been eradicated from Malta and the adjoining islands. Receveur spoke of experience in the Lake Tchad district with a goat-adapted strain obtained from the Cameroons, but which had originated in Kabete and which gave very irregular results. A strain obtained direct from Kabete gave better results. The Lake Tchad cattle are very resistant to rinderpest. Kesteven spoke of experience in China where egg-adapted virus obtained from Grosse Isle appeared to have given satisfactory results in some 250,000 cattle. Difficulties were being experienced in producing the virus in China. The rabbit-adapted virus was too virulent for buffaloes and had caused deaths and the creation of new centres of infection in these animals. It was proposed to use egg-adapted virus in future in China. Vittoz, speaking of Nhatrang in Indo-China, said they used the inactivated formolized vaccine because they considered it effective and because they did not wish to have trouble with post-vaccinal mortality in a country which was still in a disturbed state after the war. Capobiancho said that Italy had been exposed to risk of infection with rinderpest by the importation of cattle from the Sudan by the troops during the war, but the danger had been averted by quarantine measures. He was particularly pleased to learn that rinderpest had been eradicated from Malta.—M. C.

Purchase, H. S. (1948.) Notes et renseignements sur les méthodes actuelles efficaces de prophylaxie de la peste bovine. **[Rinderpest. Methods of immunization.]**—*Bull. Off. internat. Epiz.* **29.** 368–370. **2171**

This article is almost a reproduction of the

paper which is abstracted above but without the discussion. [See preceding abst.]—M. C.

SIMMONS, R. J. (1948.) **Nigeria. Rinderpest vaccine. [Correspondence.]**—*J. Amer. vet. med. Ass.* **113.** 382. **2172**

The vaccine which has been used in Egypt since 1946 is the goat-adapted virus of the Nigerian strain obtained from Vom. One million cattle have been immunized, with a mortality due to vaccination of 0·1%. This information comes from a letter sent to the author, former Director of Veterinary Services, Nigeria, by the Director of Veterinary Services, Cairo.—M. C.

LALL, H. K. (1947.) **Some observations on the immunization of sheep and goats against rinderpest.**—*Indian J. Vet. Sci.* **17.** 11–12. **2173**

L. observed that in goats anti-rinderpest serum and goat tissue vaccine given simultaneously produced a solid immunity in Betal and hill breeds. Severe reaction was caused by administration of vaccine followed by serum after 24 hours. The dose of serum is slightly higher for hill goats than that for Betal goats.

Goat tissue vaccine alone can be used against rinderpest in Bikaneri, Hissari and local breeds of sheep. Lohi lambs still react severely. The reaction produced in sheep and goats by bull virus was milder than that produced by goat tissue virus. The duration of the reaction varied with the dose.
—S. L. MUKHERJI.

VAN DEN ENDE, M., DON, P. A., & KIPPS, A. (1949.) **The isolation in eggs of a new filtrable agent which may be the cause of bovine lumpy skin disease.**—*J. gen. Microbiol.* **3.** 174–183. [Authors' summary copied *verbatim.*] **2174**

Using a filtrate from an emulsion of skin nodules, lymph nodes and a milk-duct nodule from a calf dead of bovine Lumpy Skin Disease as starting material, a filtrable agent was isolated by serial passage in chick embryos. The agent affects mainly the skin structures of the chick embryo and results in a characteristic shrunken featherless embryo tightly wrapped in its amnion, and with almost complete disappearance of amniotic fluid.

The agent appears to be a filtrable virus approximately 10–25 mμ in diameter. It was not pathogenic for day-old chicks and adult fowls. It was neutralized by the serum of fowls which had received repeated intramuscular injections of the virus, suggesting that it is etiologically related to Lumpy Skin Disease in cattle. Further work is needed before such a relationship can be regarded as established.

The virus withstood heating to 60° for 20 min., survived in 50% glycerol for at least 1 week, and at a temperature of +4° for at least a month. It was destroyed by boiling for 2 min. and by incubation at 37° overnight. Desiccation destroyed a large part of the virus in a suspension, but that part which withstood the drying process survived for at least a month.

KODRNJA, E. (1948.) Vakcinacija svinja protiv zarazne uzetosti. **[Vaccination of pigs against porcine encephalomyelitis.]**—*Vet. Arhiv.* **18.** 131–165. [French & German summaries.] **2175**

In Jugoslavia an aluminium hydroxide adsorbed, formol-killed vaccine against Teschen disease was prepared from a passaged virus.

In 1947 out of 17,813 pigs vaccinated subcutaneously with this vaccine 36 became infected. In 1948 out of 10,615 pigs 26 became infected. At the same time out of 8,446 pigs which had not been vaccinated 209 became infected.—E. G.

VERLINDE, J. D. (1946.) Over een nieuw type van het virus van carré. **[A new type of distemper virus.]**—*Tijdschr. Diergeneesk.* **71.** 210–215. [English and French summaries. English summary slightly amended.] **2176**

In a form of canine distemper a virus was demonstrated which immunologically differed from the known Carré virus. In order to distinguish between the two, the author refers to the classical virus as Carré virus A, and the new one as Carré virus B.

ANON. (1948.) **Immunization with canine distemper vaccine by the Green method.**—*J. S. Afr. vet. med. Ass.* **19.** 38. **2177**

This brief note records that permits for the importation of Green's "distemperoid" vaccine into S. Africa had been granted. Experience of its use by practitioners indicates that it is not unattended by danger and that in some cases the immunity produced is inadequate. In three reports involving 123 dogs no ill effects were produced and immunity appeared to be satisfactory. In three other reports involving 189 dogs there were 21 severe reactions with nine deaths attributed to the vaccine. Thirty of the dogs had no reaction or very mild reactions and all of these subsequently proved to be susceptible to virulent infection.—M. C.

I. GROULADE, M. J. (1948.) Le virus de Green dans le traitement de la maladie de Carré. **[Ferret-adapted virus in the treatment of canine distemper.]**—*Bull. Acad. vét. Fr.* **21.** 75–79. **2178**

II. GORET, P., MÉRY, F., MUTEL, A., & VILLEMIN, P. (1948.) Vaccination contre la maladie de Carré par virus vivant adapté au furet (méthode de Green). **[Vaccination against distemper with ferret-adapted virus.]**—*Ibid.* 105–112. **2179**

III. GORET, P., BRION, A., BERTRAND, M., &

VILLEMIN, P. (1948.) Traitement de la maladie de Carré du chien par virus vivant adapté au furet (methode de Green). [**Treatment of canine distemper with ferret-adapted virus.**]—*Ibid.* 215–220. **2180**

I. Sixty-two cases of typical dog distemper were treated with a single injection of ferret-adapted virus plus symptomatic treatment. There were six deaths, the remainder recovered after illness of variable duration. The best results were obtained where a temperature of 39°–39·5°C. was the only symptom. In advanced cases the treatment had no effect. In no case did the virus aggravate symptoms.

II. Ferret-adapted virus from the U.S.A. proved to be virulent to French dogs after 60 passages in French ferrets. 11% of vaccinated dogs contracted distemper. The dose issued for general use was 10 mg. Two series of controlled experiments in the field were undertaken. At Lyons 65 dogs were vaccinated. There were 12·8% breakdowns and 7·7% inoculation accidents. In Paris 73 dogs were vaccinated and there were 15% inoculation accidents and 9·6% breakdowns. It was concluded that the virulence of Green's virus was increased by passage through French ferrets. The possibility of contamination of vaccine with virulent virus was guarded against.

III. Thirty-four dogs were treated with Green's virus after 2–5 passages in ferrets. Doses of 10 mg. were employed. Nine cases treated 2–4 days after onset made rapid and in three cases spectacular recovery. In six dogs treated 3–6 days after onset there were four rapid cures and two deaths. Fifteen dogs were treated 8–15 days after onset, three appeared to benefit, ten derived no benefit and in two cases symptoms were aggravated.

Observations are made on Green's "cell block" or interference phenomenon theory.

—G. V. LAUGIER.

YUTUO, L. M. (1948.) **Distemperoid virus—Clinical observations on its value in dogs in the Philippines.**—*Indian Vet. J.* **24.** 236–240. **2181**

Y. observes that canine distemper is common among dogs in the Philippines and that about 50% of them die of distemper annually. He outlines the comparative merits of some of the products employed to control the disease and finally recommends preventive and prophylactic use of distemperoid (ferret-adapted) virus. Six cases successfully treated with distemperoid virus associated with proper nursing and use of sulphonamides are described. It is pointed out that in dogs with any symptoms suggestive of rickets, avitaminosis, internal parasites, convulsions and other similar ailments, these must first be attended to. The dose prescribed is 25 mg. in horse serum, diluted with 2 ml. sterile distilled water shortly before use. It is stated that the bigger the dose of the virus the less marked is the reaction in inoculated animals.—TUFAIL AHMAD SIDDIQUI.

INNES, J. R. M. (1949.) **Hepatitis contagiosa canis (Rubarth) in Great Britain.**—*Vet. Rec.* **61.** 173–175. **2182**

A summary is given of the clinical and pathological features of this disease which was established by RUBARTH [*V. B.* **18.** 369.] as a febrile infection of dogs distinct from canine distemper. The possession of records and slides of cases of distemper-like disease has enabled the author to identify three cases of the disease which have occurred in England, the first occurring in 1935. The clinical history, P.M. and microscopic findings are noted and illustrations of lesions from British and North American sources are included.

—K. G. TOWERS.

INNES, J. R. M. (1949.) **Inclusion and crystalline bodies in distemper, fox encephalitis, contagious canine hepatitis and in normal dogs.**—*Brit. vet. J.* **105.** 99–102. **2183**

The variation in the nature and distribution of inclusion bodies in dog distemper and distemper-like diseases is discussed. The author suggests that the examination of a large number of cases of these diseases coupling the histological and clinical data would achieve progress, possibly by assisting rapid diagnosis. The finding of similar inclusion bodies in fox encephalitis and in contagious canine hepatitis has now suggested that a common virus is responsible. Crystals occur normally in the nuclei of liver cells of both normal and diseased dogs and their variation in shape may cause confusion with inclusion bodies.

—K. G. TOWERS.

JENNINGS, A. R. (1949.) **Virus diseases in the cat.**—*Brit. vet. J.* **105.** 89–98. **2184**

Separate accounts are given of feline influenza and feline enteritis, which are indicated as virus infections by filtration and transmission experiments using kittens. Other laboratory animals were immune, with the possible exception of mice which may be susceptible to the influenza infection. The haematology and pathology of the diseases received special attention. While the blood changes of feline influenza are not marked in feline enteritis there is a significant leucopenia caused by a reduction in the numbers of the neutrophiles.

Feline influenza is a milder and more chronic condition than the acute and fatal enteritis and the changes found in the eyes and in the respiratory tract are described in detail. Inclusion bodies were not noted in this disease, but in spleens from feline enteritis cases many intranuclear bodies were observed.—K. G. TOWERS.

HAMRE, D., & RAKE, G. (1947.) **Studies on lymphogranuloma venereum. V. The action of some antibiotic substances and sulfonamides *in vitro* and *in vivo* upon the agents of feline pneumonitis and lymphogranuloma venereum.** —*J. infect. Dis.* **81.** 175–190. **2185**

Infected yolk sac suspensions were used in all the experiments as the source of the agents of the two diseases.

In experiments *in vivo*, equal parts of the yolk sac suspension containing the agent and of a solution of the chemotherapeutic substance to be tested were injected into the yolk sac of 6–7 day-old chick embryos; negative results were obtained with 1·24 mg. sulphathiazole, 2·5 mg. *p*-aminobenzoic acid and 20,000 units streptomycin. Reduction of the infecting dose of the agent of lymphogranuloma from one million to one thousand infective doses also failed to reveal any protection from 20,000 units streptomycin.

Penicillin was active against both agents and apparently more so against the agent of lymphogranuloma. Nevertheless, the agent could be found in yolk sac smears from most of the eggs infected with pneumonitis, even in those treated with large doses of penicillin and also in some of those infected with lymphogranuloma. When yolk sacs, on which smears were negative, were passaged to other eggs, the virus could be demonstrated in all cases. Penicillin treatment at the level of one thousand units per egg, of eggs infected with the agent of feline pneumonitis, administered 24 hours after infection, was just as effective in preventing death of the embryos as when given with the inoculum. Of the eggs treated 48 hours after infection, only 10% were protected and this is explained by the fact that the agent increases a thousand-fold between 24 and 48 hours after infection.

In experiments *in vitro* 500 mg. % sulphamerazine, 5 g. % sulphaguanidine and 2 g. % *p*-aminobenzoic acid were inactive against the agent of pneumonitis while 4 g. % sulphathiazole caused a slight delay in the deaths of the embryos. Four g. % sulphathiazole inactivated the agent of lymphogranuloma. Streptomycin and streptothricin had no effect on either agent. Penicillin (100,000 units per ml. S/A ratio 0·74) protected 20% of eggs inoculated with the agent of pneumonitis while the same dose of a different lot of penicillin (S/A ratio 0·95) failed to protect, but delayed death in embryos receiving a slightly higher inoculum. It was necessary to use 40,000 units penicillin to inactivate a sufficient amount of the agent of lymphogranuloma to prevent death of embryos.—A. L. WILSON.

RUSTIGIAN, R., & PAPPENHEIMER, A. M. (1949.) **Myositis in mice following intramuscular injection of viruses of the mouse encephalomyelitis group and of certain other neurotropic viruses.** —*J. exp. Med.* **89.** 69–92. [Authors' summary copied *verbatim.*] **2186**

A study has been made of the local effects following intramuscular injection of various neurotropic viruses.

Early massive necrosis of muscle fibers accompanied by edema and acute inflammatory reaction is produced by Jungeblut's SK virus even in low concentrations. Similar but more slowly developing lesions follow the introduction of mouse encephalomyelitis GD-VII and FA strains. Strain 4727 (TO type) produces inflammatory changes with fibrosis in the intermuscular septa and necrosis of scattered individual fibers. The relatively avirulent FV strain (TO type) was not pathogenic for skeletal muscle. The Mitchell strain of lymphocytic choriomeningitis virus gives rise to a profuse lymphocytic and monocytic infiltration of the fat and connective tissue but does not cause necrosis of muscle fibers. No significant lesions resulted from intramuscular injection of the murine-adapted human poliomyelitis Lansing virus, the HF strain of herpes, a strain of Eastern equine encephalitis virus, or a still unidentified demyelinating mouse virus. Evidence is presented that the mouse encephalomyelitis virus GD-VII and Jungeblut's SK virus multiply locally in the injected limb. The GD-VII virus has been passed through four muscle to muscle passages and muscle lesions have been elicited at the same time. Specific and complete protection against myositis was obtained by anti-GD-VII and anti-SK rabbit sera.

LUCAM, F. (1948.) Identification de la peste aviaire dans la région lyonnaise. **[Fowl plague [Newcastle disease?] in Lyons.]**—*C.R. Soc. Biol., Paris.* **142.** 1502–1503. **2187**

The last recorded outbreak of fowl plague in France was in 1926. During the past two years serious losses had occurred in a number of different districts in France, but the cause had not been determined. L. studied an outbreak which occurred in November 1948 near Lyons. The clinical symptoms and P.M. lesions were those of fowl plague. Bacteriological examination of bone marrow, liver, blood and brain tissues gave negative results. Infection was transmitted experimentally by intramuscular inoculation of fowls with liver emulsion. The incubation period was four days. A virus was passaged in chick embryos by inoculation on to the chorioallantoic membrane.

It has not yet been determined whether the virus is that of fowl plague or of Newcastle disease.—M. C.

LUCAM, F. (1949.) Existence de foyers de pest

aviaire dans le Sud-Est. **[Newcastle disease in south-eastern France.]**—*Bull. Acad. vét. Fr.* **22.** 67–70. **2188**

This is a recapitulation of the information given in the preceding abstract. The occurrence of a fresh outbreak near Marseilles is recorded and it is stated that the source of infection was fowls purchased from ships in the docks at Marseilles. These fowls had been brought by sailors from such countries as Italy and North Africa. In a discussion on this paper Jacotot stated that he had seen another outbreak at Var in the south-east of France in which 800 fowls had died. He had been able to transmit infection using filtered material, and had infected pigeons with such material on two occasions.—M. C.

IDNANI, J. A., & SEETHARAMAN, C. (1947.) **Transmission of Ranikhet [Newcastle] disease of fowls.**—*Indian J. Vet. Sci.* **17.** 167–169. **2189**

Ranikhet (Newcastle) disease could not be transmitted with spleen tissue virus enclosed in gelatin capsules or made into pill form with wheat-flour base or mixed in grain feed. Birds contracted the disease from drinking water infected with tissue suspension.

It was found that birds could contract the disease in three hours from an infected bird kept at a distance of two feet, but not at three feet.

—P. C. GANGULEE.

CUNNINGHAM, C. H., & DARDIRY, A. H. E. (1948.) **Distribution of the virus of infectious bronchitis of chickens in embryonated chicken eggs.**—*Cornell Vet.* **38.** 381–388. [Authors' summary copied *verbatim.*] **2190**

Embryonated chicken eggs inoculated with the virus of infectious bronchitis of chickens via the allantoic sac had the highest concentration of the virus in the chorioallantoic membrane followed in order by the allantoic fluid, amnionic fluid, and liver. Yolk fluid was innocuous. The maximum titer of the virus was obtained at the thirty-sixth hour after inoculation. The titer of the virus was greater in materials collected from living embryos than from embryos dead at the same post-inoculation interval. The titer of materials collected from living embryos increased in direct proportion to the length of the postinoculation period. The titer of materials collected from dead embryos decreased in direct proportion to the length of the postinoculation period.

The virus was thermolabile in eggs subjected to the incubation temperature of 99°F. for 8 to 12 hours after the death of the embryo. The maximum embryo mortality rate occurred between the twenty-fourth and thirty-sixth hours after inoculation. Allantoic fluid preparations of the virus stored at −35°C. retained the initial titer for 30 days, but storage for 60 days resulted in a tenfold decrease in titer. Eggs inoculated via the allantoic sac with virus preparations that had been stored for 60 days yielded chorioallantoic membranes with a titer equal to that of the virus at the time of initial storage. The titer of the allantoic fluid of these eggs did not exceed that of the inoculum. Eggs inoculated with a 10^{-3} dilution of the virus that had decreased tenfold in titer on storage at −35°C. for 60 days did not yield materials with a titer as high as that in materials in eggs inoculated with the undiluted virus.

FRAUCHIGER, E., & SCHMID, G. (1949.) Poliomyelitisgleich Liquorbefunde bei Rindern in Geh ften mit Fällen von menschlicher Kinderlähmung. **[Poliomyelitic cerebrospinal fluid reactions in cattle on farms harbouring cases of human infantile paralysis.]**—*Schweiz. med. Wschr.* **79.** 316–317. **2191**

This is a preliminary report from the Department of Veterinary Medicine of Berne University. It describes the results of 150 lumbar punctures performed on cattle from large and small farms and slaughter-houses during epidemics of human poliomyelitis.

Only in one cow on each of two farms where cases of infantile paralysis occurred could poliomyelitic cerebrospinal fluid (C.S.F.) findings be established. Shortly before or shortly after the familial sequences of abortive and paralytic cases of poliomyelitis, one cow in each place happened to have a disorder affecting the central nervous system, and resembling poliomyelitis in the second case.

The C.S.F. reactions determined 3–4 months later clearly suggest poliomyelitic syndromes, indicated by high total protein values, weakly positive colloidal reactions, and raised fluid pressure in one case. These findings relate to cows stabled in positions adjoining those of the animals which had previously had clinical symptoms.

Epidemiological questions and virus identification are not treated here.

The authors consider that large-scale C.S.F. tests should be carried out on domestic animals in times of human epidemic.—G. P. MARSHALL.

MATHEWS, F. P. (1949.) **Poliomyelitis epidemic, possibly milk-borne, in a naval station, Portland, Oregon.**—*Amer. J. Hyg.* **49.** 1–7. [Author's summary copied *verbatim.*] **2192**

There has been described a fairly explosive outbreak of severe poliomyelitis involving at least 11 men in a military establishment with a population of 1,400. Since officers were more heavily attacked, and were found to have consumed more milk than enlisted men during the

period of possible infection, milk is suggested as a vehicle of dissemination of the virus.

RECTOR, L. E. (1949.) **The mole as a possible reservoir of poliomyelitis.**—*Arch. Path.* **47.** 366–377. [Author's summary copied *verbatim.*] **2193**

Several reasons why the mole might be the natural reservoir of poliomyelitis are enumerated and discussed. Forty-three moles have been exposed to, or inoculated with, virus of poliomyelitis obtained from the following sources: mouse brain experimentally infected with the rodent-adapted strain of Lansing virus, brain and spinal cord of a human patient who died of poliomyelitis, and stools of four infected human beings. Of these animals, but 2 have survived. Two distinctly different types of terminal behavior are described. The survival time of the infected animals is unpredictable, regardless of the source of the inoculum, the route of inoculation or the relative position of the animal in serial passage. There is no tendency of the virus to become fixed. Possible routes of inoculation other than intracerebral have not been adequately investigated. Miscellaneous autopsy observations and terminal behavior traits are tabulated and discussed. Successful passage of the virus from mole to mole and from mole to Swiss mouse and cotton rat is reported. Unsuccessful attempts to pass the virus to 3 monkeys is reported. The absence of atypical histopathologic lesions of poliomyelitis in the moles and the Swiss mice and cotton rats in which passage of mole brain and spinal cord was effective is discussed, and the literature concerning similar experiences of other investigators is reviewed. Fifteen animals were employed as controls for comparative studies of autolytic changes, dietary deficiency, ability of the mole's brain to respond with mobilization of inflammatory cells, trauma of handling and reaction to foreign protein.

MELNICK, J. L. (1949.) **Isolation of poliomyelitis virus from single species of flies collected during an urban epidemic.**—*Amer. J. Hyg.* **49.** 8–16. [Author's summary copied *verbatim.*] **2194**

In an attempt to determine possible correlations between single species of flies and poliomyelitis, over 93,000 flies trapped at random throughout an urban area during an epidemic were identified and examined for poliomyelitis virus by species during the course of the epidemic. Cynomolgus monkeys were used as test animals for virus.

At the peak of the epidemic, only the blow flies, *Phormia regina* and *Phaenicia sericata*, yielded positive tests. Two weeks later in the epidemic, the positive species were *Phormia regina*, and in addition the common house fly, *Musca domestica*, and flesh flies, *Sarcophaga* spp. In the next 2-week period no positive isolation was obtained from any of the species. In the last 2-week period when the epidemic had practically ceased, all species were negative with the exception of *Cynomyopsis cadaverina*. This species was not present during the height of the epidemic and only came into prominence during the last 2-week period when it was found to be carrying virus.

The finding of virus in a particular species is not merely a reflection of a larger numerical prevalence of that particular species. Thus, in one period of this study, *Sarcophaga* spp. made up 4 per cent of the total flies in the area and *Musca domestica* made up 3 per cent. Yet both these species were found positive for virus, whereas at this time *Ophyra leucostoma* and *Phaenicia sericata*, which made up 20 per cent and 24 per cent, respectively, of the fly population, were both negative. Fly species found to be carrying virus were also tested in monkeys other than cynomolgus. While positive tests were obtained in both cynomolgus and rhesus monkeys, the cynomolgus yielded a higher incidence of virus isolations. Of 12 cynomolgus monkeys inoculated with virus containing flies, 7 developed experimental poliomyelitis; whereas of 14 rhesus monkeys, two developed the disease. The data presented should be considered only as the results of a study of a single urban epidemic.

BYRD, C. L. (1949.) **An improved technique for the transmission of the Lansing type virus of poliomyelitis in mouse experiments.**—*J. Lab. clin. Med.* **34.** 560–561. [Author's summary copied *verbatim.*] **2195**

An improved technique was described for the propagation of the virus of poliomyelitis from mice to mice. This method consists of injecting less purified suspensions in unbuffered saline bilaterally into the brain.

TOOMEY, J. A., TAKACS, W. S., & SCHAEFFER, M. (1948.) **Attempts to infect *Amoeba proteus* with poliomyelitis virus.**—*Amer. J. Dis. Child.* **75.** 11–14. [Abst. in *Bull. Hyg., Lond.* **23.** 551. (1948), copied *verbatim.*] **2196**

The results of our experiments show that amoebas can carry the Lansing virus mouse strain when massively infected, but only for a brief period. There was no evidence that virus was present in the amoebas 3, 30, and 60 days after exposure.

AYCOCK, W. L., & OREN, W. F. (1947.) **Prolonged incubation period as an epidemiologic principle. Infectious hepatitis and homologous serum jaundice.**—*Amer. J. med. Sci.* **214.** 483–

492. [Abst. in *Bull. Hyg., Lond.* **23.** 222. (1948), copied *verbatim.* Signed: A. M. McFarlan.] **2197**

The authors refer to experiments which show a prolongation of the incubation period (1) of vaccinia in monkeys which had received immune serum, (2) of poliomyelitis in monkeys when the virus had been mixed with immune serum, and (3) of influenza A in mice when the virus had been mixed with normal human γ-globulin. In man the average incubation period of homologous serum jaundice was increased from 84 to 103 days by inoculation of γ-globulin during the incubation period. Antibody in the recipient or in the inoculum may prolong the incubation period.

Figures collected from records of transmission of infectious hepatitis and homologous serum jaundice are grouped to show that the average incubation period in cases following parenteral inoculation is longer than in those following intranasal or oral administration or contact spread: for infectious hepatitis the increase is from 28·4 to 61·6 days and for homologous serum jaundice from 46·1 to 87·8 days. In cases following intranasal or oral administration, the average incubation period is longer after blood serum (38·8 days) than after nasal washings or faeces (29·9 days). These increases might be due to the presence of antibody in the recipient and in the inoculum.

Discussion of the available evidence on the subject of lack of cross immunity between the two forms of jaundice and of lack of secondary cases in contacts of patients with homologous serum jaundice leads to the conclusion that such evidence is not sufficient to differentiate them. [The charts suggest that the estimates of the longer incubation periods are not very reliable as a basis for argument.]

See also abst. **2226** (lymphocytic choriomeningitis).

Huebner, R. J., Jellison, W. L., Beck, M. D., & Willcox, F. P. (1949.) **Q fever studies in Southern California. III. Effects of pasteurization on survival of *C. burneti* in naturally infected milk.**—*Publ. Hlth Rep., Wash.* **64.** 499–511. [Authors' summary copied *verbatim.*] **2198**

Four rigidly observed tests of the holding vat and the high temperature fast time (HTST) techniques of pasteurization, as employed in the Los Angeles area were completed in five separate experiments. The presence or absence of infection was determined chiefly by serum reactions in the complement fixation test for Q fever shown by guinea pigs and mice 30 days or more after being injected with the milk specimens.

So far as could be determined by the methods available, milk supplies pasteurized in the HTST equipment were rendered free of infection, although the same milk in the raw state was shown in each instance to be highly infectious.

In three of the four vat pasteurization experiments using the holding vat without space heater, *C. burneti* [*R. burneti*] apparently was eliminated from the infected milk supplies. However, the pasteurized milk from one of the four tests of the holding vat method produced antibodies against Q fever in 3 of 20 guinea pigs tested. Similarly 3 of 32 specimens taken from bottles of vat pasteurized market milk and 1 of 4 specimens of vat pasteurized market cream produced antibodies against Q fever when injected in guinea pigs.

IMMUNITY

Thjötta, T., & Jonsen, J. (1949.) **The influence of complement upon agglutination.**—*Acta path. microbiol. scand.* **26.** 326–334. [Authors' conclusions copied *verbatim.*] **2199**

The agglutination reaction between Shigella and Salmonella strains and their homologous immune sera may be inhibited by a factor resident in active immune sera.

The inhibiting factor has been identified with complement.

Dolman, C. E. (1948.) **Oral immunization.**—*Amer. J. med. Sci.* **215.** 327–351. [Abst. in *Bull. Hyg., Lond.* **23.** 552. (1948), copied *verbatim.* Signed: J. C. Cruickshank.] **2200**

This is an extensive and well-documented critical review of the significant literature relating to oral immunization, covering laboratory experiments and field trials with vaccines of the intestinal pathogens, the tubercle bacillus and various other bacteria, and of the bacterial exotoxins. The paper is itself a summary, which cannot be abstracted, but the author's general conclusions may be briefly noted.

The experimental and epidemiological data in support of oral immunization are flimsy, but there is some evidence that, in some diseases, a degree of immunity can be established. The oral route is uncertain and is inferior to subcutaneous injection. Its simplicity, cheapness and innocuity would warrant further serious consideration of the method if there was likelihood of improving the response obtained. The evidence, however, suggests that oral dosages large enough to ensure regular passage of effective amounts of antigen through the intestinal mucosa would entail grave risk of producing reactions of great severity.

Further, modern views of immunity mechanisms lend little support to Besredka's conception of the significance of local intestinal immunity. The author feels strongly that there is no present justification for even occasional resort to oral immunization and considers that licensing authorities should discountenance distribution of products intended for this purpose.

KABAT, E. A., BAER, H., & KNAUB, V. (1949.) **Immunochemical studies on blood groups. IX. Specific precipitation of the fucose of hog and human blood group A substances by anti-A.** —*J. exp. Med.* **89.** 1–10. [Authors' summary copied *verbatim.*] 2201

Analyses of specific precipitates of hog and human blood group A substances for the amount of fucose precipitable by antibody have shown, that with certain preparations, essentially all of the fucose of the blood group substance is precipitated.

BRION, A. (1947.) L'ictère du muleton. [*Icterus neonatorum* **in the mule.**]—*Rev. Path. comp.* **47.** 317–321. 2202

This is a general discussion describing the development of knowledge of the causation of this condition. Reasons are given for rejecting the hypothesis that pre-natal infection with *Babesia equi* is the cause and for accepting the theory of CAROLI & BESSIS [*V. B.* **18.** 86] that this is a haemolytic disease resulting from iso-immunization of the dam against the blood cells of the donkey.—M. C.

MOVITZ, D., HOWELL, K. M., SAPHIR, O., & STRAUSS, A. (1948.) **Production of an anti-reticular cytotoxic serum.**—*Arch. Path.* **45.** 772–783. [Authors' summary copied *verbatim.*] 2203

A technic of preparing rabbit spleen and red bone marrow to be used as a tissue antigen (a) for intravenous administration and (b) for the complement fixation titration of the antiserum is presented. Immune serum was prepared by repeated intravenous injections of the antigen, which was given in increasing quantities. The titer of the immune serum was demonstrated by the complement fixation test, three modifications of which were tried. There may be slight variation in the numerical titer demonstrated by the three modifications. The cold method revealed the highest titer, and in most cases the serial antigen dilution method the next highest. At first, with the lower levels of antibodies, however, the serial serum dilution method appeared in our series the more sensitive. Antireticular cytotoxic serum was readily produced in 3 rabbits with guinea pig tissue antigen. However, a moderate amount of heterophil antibody was found which necessitated absorption of this antibody and retitration, a procedure which brought the antireticular cytotoxic antibody titer of 1 : 1,280 to 1 : 320. Antireticular cytotoxic serum is much more readily produced, and in much higher titer, in the rabbit than in the dog.

HEMMERT-HALSWICK, A. (1947.) Das Allergieproblem vom Standpunkt der pathologischen Anatomie. [**The problem of allergy from the point of view of pathological anatomy.**]—*Berl. Münch. tierärztl. Wschr.* No. 10. pp. 109–115. 2204

A rather lengthy general review with no new information, but containing a useful bibliography of German work on this subject.—E. G.

PALA, A. (1948.) Inibizione di lesioni mio-endocardiche da ipersensibilitià serica nel coniglio a mezzo del salicilato di sodio. [**Inhibition of myo-endocardial lesions of hypersensitivity and heterologous serum in rabbits by means of sodium salicylate.**]—*R.C. Inst. Sanit. publica, Roma.* **11.** 351–371. [English, French & German summaries. English summary copied *verbatim.*] 2205

Sodium salicylate, administered intravenously in progressive quantities to rabbits subjected to one or more recurrent cycles of sensitization and allergic reaction by means of normal horse serum ("shock cycles"), has proved to exert an "anti-allergic action" by inhibiting the appearance of those lesions of hypersensitiveness which are usually encountered in the heart of animals sensitized with a heterologous serum.

This antiallergic action has been more pronounced and decided in animals subjected to a smaller number of anaphylactic shocks.

I. DAVIDSON, A. G., BARON, B., & WALZER, M. (1947.) **Factors influencing reagin formation in experimental human sensitization to *Ascaris lumbricoides* antigen. I. Influence of chronic infection (tuberculosis) on rate of sensitization.** —*J. Allergy.* **18.** 359–368. 2206

II & III. KAILIN, E. W., DAVIDSON, A. G., & WALZER, M. (1947.) **Factors influencing reagin formation in experimental human sensitization to *Ascaris lumbricoides* antigen. II. The influence of sex as a factor in rate of sensitization. III. The influence of race as a factor in rate of sensitization with further observations on the sex factor.**—*Ibid.* 369–372; & 373–380. [Abst. in *Trop. Dis. Bull.* **45.** 452. (1948), copied *verbatim.* Signed: L. E. NAPIER.] 2207

This is a study on allergy, and the relation to *Ascaris* infection is not considered.

I. FÜLLEBORN and KIKUTH and others have shown that sensitization of the skin to *Ascaris*

lumbricoides could be induced in man. The antibodies responsible for the immediate skin reactions in *Ascaris* hypersensitiveness are atopic reagins.

In these studies the extract was prepared from *Ascaris lumbricoides* (pig). The worms were first washed in water, afterwards in toluol. "They were then covered with a slight excess of buffered saline and with a layer of toluol. This was allowed to stand at room temperature until most of the worms had disintegrated. The material was paper-filtered and sterilized by Seitz filtration on June 2, 1933. The extract was bottled, covered with a layer of toluol, and stored in the ice box. On September 3, 1935, it was again passed through a Seitz filter. At this time the total nitrogen content determined by the macro-Kjeldahl method was 5·3 mg. N per ml. From this stock material, proper dilutions for use in this study were made."

The experimental subjects were selected by giving a test dose of 0·025 ml. of an extract containing 0·1 mgm. of N per ml. Only persons giving a negative reaction were used. Sensitizing doses of 0·1 ml. were given at intervals of one week until complete sensitization was effected, or 12 doses had been given. A positive reaction was indicated by the formation of a weal and erythema.

About one-third of the persons given the test dose showed positive or doubtful reactions and were excluded from the experiment.

The sensitization developed in the rest at variable rate: 19 per cent. became sensitive at the time of the third sensitizing dose (S_3), 54 per cent. at S_5, 81 per cent. at S_2, and 92 per cent. at S_{12}.

Chronic tuberculous infection was not a factor influencing the rate of development of sensitivity, but sensitivity developed more rapidly in males than in females. The number of positive reactions was higher by about 25 per cent. in males than in females between the S_4 and S_8, but the final percentages, *i.e.*, at S_{12}, were equal in the two sexes.

II. The observation made in the earlier investigation that active sensitization to *Ascaris* antigen develops earlier in the male was confirmed, and it was incidentally indicated that there is earlier sensitization to the antigen in the Negro race than in white persons.

III. Further confirmation was obtained of the earlier sensitization to *Ascaris* antigen of negroes compared with white persons and males compared with females. There was no correlation between the rate of sensitization and the natural sensitivity in the four population groups, which was undoubtedly, but not demonstrably, associated with present or past helminthic infection. There was no correlation between rate of sensitization and age.

FRIEDEWALD, W. F., MILLER, E. S., & WHATLEY, L. R. (1947.) **The nature of non-specific inhibition of virus hemagglutination.**—*J. exp. Med.* **86.** 65–75. [Authors' summary copied *verbatim.*] **2208**

A study of the component in serum and tissue extracts responsible for non-specific inhibition of hemagglutination with mumps virus and the PR8 and Lee strains of influenza virus has yielded the following results: (1) The inhibitory factor was found in high titer in human serum and in saline extracts of various organs procured at autopsy (lung, liver, kidney, spleen). The inhibition titers of extracts of these organs were usually higher than the serum titers, whereas the titers of muscle extracts were invariably lower. (2) Similar results were obtained with serum and tissue extracts from normal rabbits and guinea pigs. (3) The serum inhibition titers were not affected by heating to 75°C. for 30 minutes, whereas the titers of the tissue extracts were usually reduced by heating at 65°C. or 75°C. for 30 minutes. (4) Saline extracts of human and chicken red blood cells also contained an inhibitory substance in high titer, and these cells showed marked agglutination with influenza and mumps viruses. Rabbit red cells, on the other hand, underwent little or no agglutination with these viruses and extracts of these cells failed to cause inhibition. Sheep red cells varied in their capacity to agglutinate and also in their yield of the inhibitory substance. (5) When the virus receptor substance was removed from chicken red cells by adsorption and elution with influenza virus, extracts of the cells no longer yielded the inhibitory factor. (6) The inhibitory substance did not neutralize influenza virus in mice and it failed to fix complement when mixed with influenza or mumps viruses. (7) Evidence was obtained that some virus was released from the inhibitory substance after incubation for 6 hours at 22°C. or 37°C.

The implications of these findings are discussed.

COHEN, S. S., & FOWLER, C. B. (1948.) **Chemical studies in host-virus interactions. V. Some additional methods of determining nutritional requirements for virus multiplication.**—*J. exp. Med.* **87.** 275–282. [Authors' summary slightly amended.] **2209**

Omission of a single constituent from a chemically defined medium approximating the bacteriophage growth-promoting properties of broth affects bacteriophage production in infected bacteria. This may be estimated by the one-step growth technique and the course of desoxyribose nucleic acid synthesis. Nine amino acids and one purine have been shown to be important by these tests. A combination of all constituents observed

to be important by the single supplement and single omission techniques has approximated the bacteriophage growth-promoting properties of broth. Certain anomalous results have been commented upon.

See also absts. **2049** (antigens); **2054** (resistance to infection); **2056** (antigens); **2065-2067** (BCG); **2072** and **2073** (swine erysipelas); **2080** (haemagglutination); **2095** and **2096** (brucellosis); **2101** (tularaemia); **2115** (syphilis); **2138-2147** (foot and mouth disease); **2152, 2156** and **2157** (rabies); **2158** (pox diseases); **2161** (influenza); **2168, 2170-2173** (rinderpest); **2175** (Teschen disease); **2177-2181** (distemper); **2230** and **2231** (nematodes); **2289** (structure of antibodies).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

OLIFSON, E. L. (1946.) **Antiparasitic preparations from xantogenic compounds.**—*Gigiena i Sanitariya.* No. 10. pp. 38–40. [Abst. in *Bull. Hyg., Lond.* **22.** 464. (1947), copied *verbatim.* Signed: C. A. HOARE.] **2210**

The author records the results of insecticidal tests with the following preparations, which were used against lice: (1) potassium xanthogenate 50 per cent., water 50 per cent.; (2) potassium xanthogenate, 40 per cent., water, 40 per cent., soap, 20 per cent.; (3) potassium xanthogenate, 30 per cent., water, 40 per cent., soap, 20 per cent., paradichlorobenzol, 10 per cent.; (4) potassium xanthogenate, 50 per cent., soap, 50 per cent.; (5) xanthic disulphide (= bis-ethylxanthogen), 50 per cent., soap, 50 per cent.

From the results, given in four tables, the following conclusions are drawn. Potassium xanthogenate can be successfully employed as an insecticide, provided its concentration in the preparation is not lower than 5 per cent. While soap is a necessary constituent of such preparations, the addition of paradichlorobenzol does not increase their insecticidal properties. Preparations containing potassium xanthogenate can be used (1) for destroying lice in the head; (2) for their destruction in clothing; and (3) for prophylactic impregnation of underwear.

DIAS, V. A. S. (1946.) Nótulas parasitológicas. Existe em Angola a *Gl. schwetzi var disjuncta* Potts 1942? [*Glossina schwetzi* **in Angola.**]—*Pecuária.* **1.** 91–93. **2211**

D. found that some of the *Glossina* species examined by him in Angola were closely related to *G. schwetzi*, but that they could be differentiated by certain morphological characters of the male genitalia. Those characters are the same as those of *G. schwetzi* var. *disjuncta* (Potts, 1942), only a very small number of which had been found up to 1946. No valuable characters of differentiation could be found in the female genitalia.—F. A. E.

GEIGY, R. (1946.) Beobachtungen an einer Zucht von *Glossina palpalis.* [**A note on a culture of** *Glossina palpalis.*]—*Schweiz. Natur. Gesell. Zurich.* pp. 155–158. [Abst. in *Trop. Dis. Bull.* **45.** 873–874. (1948), copied *verbatim.* Signed: P. A. BUXTON.] **2212**

The paper describes the maintenance of a culture of *Glossina palpalis* in Switzerland for a considerable period.

The author reviews what is known about the relation of *Glossina palpalis* to temperature. As it is established that at about 13°C. the adult flies are quite torpid and capable of surviving unfed for 10–15 days, he decided to bring them from the Congo to Switzerland in small gauze cages in an ice box. About 40 per cent. of the flies with which he started arrived alive, 22 males and 98 females reaching Basle. The original number has been increased to some extent by the importation of pupae, but it seems that six generations were reared at the time of writing and that the number of flies was increasing. The insects were kept always at 26°C. and 85 per cent. relative humidity and were offered food daily on guineapigs. Under these conditions one individual fly lived as long as 207 days and one female deposited sixteen larvae. The interval between the emergence from the pupa and the birth of the first larva is twenty-two days and after that births occur almost regularly at ten-day intervals. The duration of the pupal stage is thirty-five days in the female and about two days longer in the male.

MACKERRAS, M. J., & MACKERRAS, I. M. (1948.) **Simuliidae (Diptera) from Queensland.**—*Aust. J. Sci. Res.* Ser. B. **1.** 231–270. **2213**

The life-cycles of a number of species are described. The technique for breeding the flies in the laboratory is illustrated. There are keys for the identification of the various stages in the life-cycle.

Austrosimulium pestilens n.sp. is the only serious pest of domestic animals and man in Queensland. It breeds in fast, turbulent, muddy water during floods in inland streams and is associated with the shrub *Melaleuca* spp. in the stream beds. The inland species of these flies must possess a drought-resistant stage, probably the egg. The general biology of the flies and possible control measures are discussed.

—H. McL. GORDON.

KAHN, M. C. (1947.) **Female mosquito "calls" and their possible significance in control.**—*Kuba.* **3.** 119–120. [Abst. in *Trop. Dis. Bull.* **45.** 213. (1948), copied *verbatim.* Signed: H. S. LEESON.] **2214**

In this short article the author describes how he made recordings of the sounds produced by the females of the following mosquitoes: *Anopheles quadrimaculatus*, *Aëdes aegypti*, *Aëdes albopictus* and *Culex pipiens*. The records were made in a sound-proof chamber kept at atmospheric conditions comparable with those in the natural environments of the insects. He states that "most of the significant sounds are made while the insects are at rest" and are in the range of from 200 to 8,000 cycles per second. The recordings are not audible to the human ear; they "require to be amplified some one-hundred million times or more". He claims, however, that an experienced observer can distinguish the sounds of one genus or species from another and can also distinguish the sounds made by the sexes of the same species. When a record of a female voice is played, males of the same species fly towards it; the author therefore hopes to transfer the sounds to magnetic tape for continuous playing and to test its ability to lure males to an electrical device which will kill them.

AMOS, D. W. (1947.) **Training manual, including section on the organization of the filariasis campaign in Fiji.**—*Mosquito Control. Suva, Fiji. Revised* 1947. 43 pp. [Abst. in *Trop. Dis. Bull.* **45.** 547. (1948), copied *verbatim.* Signed: CHARLES WILCOCKS.] **2215**

This short pamphlet was written by a retired successful business man who became a Mosquito Inspector when manpower was short during the war, and who developed great interest in, and aptitude for, entomological work. It is written as a guide for field inspectors; the language is simple and clear, and there are many excellent line drawings of mosquito larvae and adults showing the important anatomical features. The mosquitoes concerned are those found in Fiji.

The pamphlet includes a key for the identification of larvae, notes on adults and their habits (various species of *Aëdes*, *Culex* and others are described), a section on mosquitoes as vectors of disease, and a section on filariasis in which the author gives his views on methods of control.

The author has studied his material at first hand, and has consulted recognized authorities. The pamphlet will undoubtedly be useful, and, indeed, has already proved its value; the comments of Dr. McGusty and Dr. Buchanan in their forewords leave no doubt on that point.

SMITH, C. N., COLE, M. M., & GOUCK, H. K. (1946.) **Biology and control of the American dog tick.**—*Tech. Bull. U.S. Dep. Agric.* No. 905. pp. 74. **2216**

The American dog tick, *Dermacentor variabilis*, is a serious pest of dogs and an important vector of Rocky Mountain spotted fever. Transmission of 140 cases per year, with a 25% mortality, is attributable to this species in the U.S.A. The pest is very difficult to eradicate as larval, nymphal and adult stages can survive for one to two years without feeding. Larvae and nymphs mainly parasitize meadow mice. The adults live on dogs and sometimes on horses and cattle. The systematic dipping of all dogs in a soap and derris powder solution every 3–4 days (at a cost of about 5 cents per treatment) reduced the number of ticks. The control of meadow mice by poisoning reduced the abundance of ticks in the treated area, as did the "burning over" of the area.

The migration habits of the ticks are discussed and it is stated that they tend to be numerous along the sides of paths and roads. Many ticks could be killed by spraying roadsides with a 0·5% D.D.T. 2·5% pine oil solution. Attempts to introduce a parasite of the tick, *Hunterellus hookeri*, were unsuccessful.—B. A. THURSTON.

KATZENELLENBOGEN, I. (1947.) **Acarodermatitis urticarioides.** — *Arch. Derm.* **55.** 621–629. [Abst. in *Bull. Hyg., Lond.* **23.** 43–44. (1948), copied *verbatim.* Signed: KENNETH MELLANBY.] **2217**

A severe itchy dermatitis due to the mite *Pediculoides ventricosus* is endemic in Palestine and is common from July to October. The mites increase in great numbers in straw and grass used for feeding animals and those persons handling these substances are affected. The eruption lasts for a week or ten days, the pruritus being most severe for the first three days.

Although *Pediculoides* does not attack man, it appears to be the living mite which is responsible for the symptoms, for fumigation of the cattle fodder, for instance, with 25 ml. of ethylene dibromide to the cubic metre, put a stop to the outbreak. Other symptoms caused by the mites were rare and no asthmatic or pulmonary symptoms were noticed. Some protection was received from the use of repellent substances on the body, though the more effective mite poisons such as dimethyl phthalate were not used.

See also absts. **2123** (*Triatoma*); **2194** (flies and poliomyelitis); **2261** (injurious millipedes); **2341** (insecticides); **2345** (veterinary clinical parasitology); **2346** (fleas of Western North America).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

COWPER, S. G. (1948.) **The effect of certain inorganic and vegetable substances on the English pond snail *Planorbis corneus* (Linné, 1758).**—*Ann. trop. Med. Parasit.* **42.** 119–130. **2218**

C. studied the use of various copper deriva-

tives for snail destruction and considered the possibility of replacing them with vegetable poisons. In experiments, using *Planorbis corneus*, none of the copper compounds tested were as effective as copper sulphate and none of the vegetable poisons had any appreciable effect.

—S. BRIAN KENDALL.

PIFANO, C. F. (1948.) La infección uni-sexual producida por *Schistosoma mansoni* en condiciones experimentales. **[Unisexual infestation in experimental** *Schistosomiasis mansoni*.]—*Arch. Venez. Patol. trop. Parasit Méd.* **1.** 63–72. [English summary.] [Abst. in *Trop. Dis. Bull.* **46.** 268. (1949), copied *verbatim*. Signed: H. HAROLD SCOTT.] **2219**

It has often been reported and even confirmed experimentally that all the schistosome cercariae coming from a single miracidium are of the same sex. The author used for his experiments white mice and cercariae from *Australorbis glabratus*, the intermediate host of *S. mansoni* in Venezuela, in the dry season. He infected 26 animals, exposing them to 18 of these snails and later found no ova in the liver, 590 males in the portal veins, 32 of "undetermined sex"; otherwise no females. It is argued from this that larval forms potentially masculine are more resistant during the dry season and that "human infestations acquired at such seasons are due to larvae predominantly, if not solely, male." Next, 20 of these animals were subjected to infection by 10 snails taken during the rainy season. When examined later, the liver was crowded with ova; in the portal vessels were 205 males, 187 females, and 16 not determined. Induction analogous to the above would be that the rainy season favours the production of larvae potentially female and that human infestation at such a period is likely to be both male and female.

The experiment was then carried a stage further. Five animals were subjected to cercariae from *Australorbis glabratus* collected during the rainy season. All five, when examined later, showed many ova in their livers and both male and female worms in the portal vessels; altogether 174 males, 147 females and 20 "not determined." Four animals were then subjected to infection by snails of the same batch which had been in the interval exposed to the sun for 10 days during which the volume of the fluid containing them had been reduced to half by evaporation. When examined later, one of the animals had a few ova in the liver, the other three had none; the first had 42 males and 10 females in the portal vessels, the others 28, 47 and 36 males respectively, but no females. [A study of much interest.]

OLIVIER, L. (1949.) **The penetration of dermatitis-producing schistosome cercariae.**—*Amer. J. Hyg.* **49.** 134–139. [Author's summary copied *verbatim*.] **2220**

Observations were made on the penetration of human skin by cercariae of *Trichobilharzia stagnicolae*, the chief cause of schistosome dermatitis in the United States. It was found that the cercariae will penetrate while fully submerged and, therefore, do not require an evaporating film of water to stimulate or aid penetration. In some tests the cercariae penetrated from relatively cool water (17°C to 23·5°C), the temperature of which changed little during the exposure period. It was also found that the itching associated with penetration of the cercariae occurs very soon after the cercarial body enters the outermost layer of the skin and that, therefore, this primary itching may be taken as a reliable indicator of the time of penetration of the cercariae. Primary itching was found to begin from 4 to 10 or more minutes after the cercariae were placed on the skin, indicating that the cercariae remain on the surface of the skin for some time before penetrating.

LEÃO, A. T., & EICHBAUM, F. W. (1947.) Ação vermicida do óleo de cajú (*Ancardium occidentale*) e derivados. Experiências em cães. **[Vermicidal activity of the cashew oil** (*Anacardium occidentale*) **and derivatives. Experiments in dogs.]**—*Mem. Inst. Butantan.* **20.** 13–30. [English summary.] [Abst. in *Trop. Dis. Bull.* **46.** 54–55. (1949), copied *verbatim*. Signed: H. HAROLD SCOTT.] **2221**

More than a century ago, in 1836, DUCHESNE recorded the use of cashew oil, *Anacardium occidentale*, in helminthiasis, and EICHBAUM the vermicidal action *in vitro* of anacardic acid, one of the constituents of the oil. The oil is contained in the pericarp. The present paper reports the results of giving the oil to infested dogs. Twenty-six dogs were used for these experiments and the infections were by *Ancyclostoma caninum*, *Toxocara canis*, *Trichuris vulpis* and *Dipylidium caninum*. Four preparations of the oil were tested: sodium anacardate, an emulsion containing 20 per cent. of the pure oil and the crude oil itself, anacardic acid, and a mixture of cardol and anacardol. Tables are presented showing the details of all the experiments carried out, but these may be summarized by saying the best results were obtained with the pure oil. The drug was given in gelatin capsules each containing 1 gm., or by stomach-tube, and in doses from 2·5 to 8 gm. according to the weight of the animals. The results were confirmed by autopsies on the dogs treated. *A. caninum* was reduced by 96·8 per cent., *Toxocara canis* was completely eliminated after a single dose, *Trichuris vulpis* reduced by 77·3 per cent. There was no evidence of any pathological lesion

of the stomach or intestinal mucosa, nor of the liver or kidneys; elimination takes place by the kidneys and the larger bile ducts.

KOENS, H. (1946.) Enkele praktijkervaringen met longworminfecties bij het lam en problemen, die voor den plattelands-practicus zich daarbij voordoen. [**Lungworm infestation in lambs and its problems in lowland grazing practice.**]—*Tijdschr. Diergeneesk.* **71.** 253–266. [English and French summaries.] **2222**

Three species of lungworms in sheep were studied on the isle of Texel. *Protostrongylus rufescens* is of no pathogenic significance. Attempts were made to control *Dictyocaulus filaria* by moving the animals systematically from pasture to pasture. It is stated that in some instances 1 mg. of pyrethrin in 10 ml. of water applied intranasally was a successful prophylactic. Curative treatment of *Muellerius capillaris* infestation with medicaments was ineffective. In some cases satisfactory results were achieved with nicotine and copper sulphate as prophylactics. [No details given.]

The author emphasizes that prophylaxis is the important object.—E. G.

BAILEY, W. S., & WILLIAMS, A. G. (1949.) **Verminous pneumonia in the cat.**—*Vet. Med.* **44.** 267–269. **2223**

The authors discuss the life-history of *Aleurostrongylus abstrusis* in the cat and report a fatal infection in a kitten, the symptoms being those of severe pneumonia without febrile response. Large numbers of characteristic larvae were found in the faeces.—K. B. SINCLAIR.

ROSS, W. M. (1948.) **A note on the collection of live adults of** *Trichinella spiralis*.—*Canad. J. comp. Med.* **12.** 152–154. **2224**

To collect live adult *T. spiralis* for the preparation of antigen, R. infected rats by dosing them with larvae, and killed them five days later, following a 24-hour fast. The small intestines were opened and rinsed in warm saline and the mucous membrane stripped and broken up in fresh solution; the suspension was pipetted on to a No. 2 Whatman filter paper placed over layers of blotting paper. The filter was turned over in warm saline in a petri dish, the warmth causing the worms to detach and concentrate at the bottom of the dish.—W. E. SWALES.

GAUGUSCH, Z. (1949.) Doświadczenia nad przechodzeniem strącalników włośniowych z samic ciężarnych drogą krążenia płodowego na potomstwo. [**Experiments on the transmission through the placenta of the Trichinella precipitins from pregnant animal to its offspring.**]—*Med. wet.* **5.** 33–35. [Abst. from English summary.] **2225**

The author states that specific precipitins of animals infected with *Trichinella spiralis* can pass through the placenta and be demonstrated in the offspring. Transmission of *Trichinella spiralis* through the placenta could not be demonstrated and thus the findings of Roth, who found that such an infection of the foetus can take place in the guinea pig, could not be confirmed.

SYVERTON, J. T., MCCOY, O. R., & KOOMEN, J., Jr. (1947.) **The transmission of the virus of lymphocytic choriomeningitis by** *Trichinella spiralis*.—*J. exp. Med.* **85.** 759–769. [Authors' summary copied *verbatim*.] **2226**

In experiments in which guinea pigs were infected concurrently with the virus of lymphocytic choriomeningitis and the parasitic nematode, *Trichinella spiralis*, proof was obtained that trichinella larvae, after maturation in the muscles, had acquired the virus and were capable of transmitting it to new susceptible hosts. Transmission resulted both when living larvae were fed to normal guinea pigs and when triturated dead larvae were injected subcutaneously. Control experiments and other tests made plain that transmission of the virus was not due to mere adherence of it to the outer surface of the larvae but that these actually harbored it.

The significance of these experiments in relation to natural transmission of the virus of lymphocytic choriomeningitis remains to be determined.

BRANDT, O., & HÜLPHERS, G. (1948.) Undersökningar rörande trikinlarvernas resistens mot kyla samt över deras utbredning i muskulaturen hos svin. [**Resistance to cold of** *Trichinella* larvae **and their distribution in the muscular tissues of swine.**]—*Svensk VetTidskr.* **53.** 310–319. [English summary copied *verbatim*.] **2227**

Investigations on the resistance of larval trichinae to freezing and on their occurrence in the muscles of swine have been carried out at the Stockholm Abattoir and in the Department of Hygiene at the Royal Veterinary College.

The carcasses of 5 pigs frozen in halves were kept at a temperature of —9° and –20°C. for a period varying from 5 to 34 days and fed to white mice. The mice which had been fed pork frozen for 10 days or more were free from trichinae, whereas those which had been fed pork after 5 days' freezing at –9°C., were trichinous.

The carcasses of 4 pigs frozen in pieces weighing about 2–3 kg were kept at a temperature of –18°C. for a period varying between 5 and 30 days and fed to mice and guinea pigs. The experimental animals which had been fed pork frozen for 10 days or more at –18°C. were free from trichinae. Mice fed pork after 5 days' freezing at –18°C., on the other hand, were trichinous.

With regard to the occurrence of larval trichinae in the muscles of swine, specimens were taken from 15 different muscle groups. It was found that the larvae occurred most numerously in the costal portion of the diaphragm. The crura of the diaphragm contained only about half the number found in the costal portion. In the next range came the following muscles: the internal and external obliques, the sternohyoid muscle, the gracilis, the peronaeus tertius, the pterygoideus, the linguae, the laryngeal muscles, the triceps brachii, the masseter, the longissimus dorsi, and the oesophagus. No trichinae were demonstrated in the myocardium.

DEL CARMEN NÚÑEZ, M., & MAZZOTTI, L. (1948.) Incidencia de triquinosis en gatos de la ciudad de Mexico. **[Trichiniasis in cats in Mexico City.]**—*Rev. Inst. Salubr. Enferm. trop.* **9.** 51–54. [Authors' summary copied *verbatim.*] 2228

300 stray cats from the city of Mexico were autopsied, examining 10 grams of the diaphragm of each animal for *Trichinella spiralis.* 75 of them (25%) were positive, most of these showing slight degrees of infection.

ALLEN, R. W., & ANDREWS, J. S. (1948.) **Observations on the viability of eggs of *Ascaris* removed from swine by treatment with sodium fluoride.**—*Proc. helminth. Soc., Wash.* **15.** 38–39. 2229

Eggs were collected from the uteri of mature female ascarids evacuated by pigs after treatment with 1% sodium fluoride for one day. The eggs were cultured and examined for viability and it was found that they developed normally and that a high percentage of them are viable and infective, not having been affected by the drug.—D. LUKE.

I. SADUN, E. H. (1949.) **The antibody basis of immunity in chickens to the nematode, *Ascaridia galli.***—*Amer. J. Hyg.* **49.** 101–116. [Author's summary copied *verbatim.*] 2230

II. SADUN, E. H. (1949.) **The effect of single infections of variable size on the resistance of chickens to the nematode, *Ascaridia galli.***—*Ibid.* 117–126. [Author's summary copied *verbatim.*] 2231

I. Sera of chickens experimentally infected with variable numbers of embryonated eggs of *Ascaridia galli* were tested for the presence of antibodies in 3 ways: in test tubes with fresh whole worm antigen, *in vitro* with living worms at different stages of their life cycle, and *in vivo* by passive transfer to young susceptible chickens.

No antibodies against the tissue antigens of the worms could be demonstrated by the precipitin test. On the other hand, antibodies reacting *in vitro* with the metabolic products of the living larvae were found to form characteristic oral precipitates. When eggs and adults were incubated in immune sera, no visible reaction occurred.

By taking as the endpoint the maximum dilution of serum in which, under standardized conditions, a typical oral precipitate is formed in one or more larvae, the relative amount of reacting antibodies was measured. A relationship between the degree of resistance in chickens that received a single or multiple infection, and the amount of reacting antibodies was found. In one experiment older chickens following a smaller infection produced a greater amount of reacting antibodies than younger ones following a greater infection. The larvae at the stage of development at which most of them start to become temporarily tissue parasites reacted at the greatest serum dilution.

Sera from infected chickens passively transferred into susceptible ones seemed to protect them. This passively transferred resistance was similar in every way to that produced by active immunization, although less striking. Passively immunized chickens were capable of eliminating the worms at a greater rate, of inhibiting their normal growth, and of surviving otherwise lethal infections. The serum of a group of chickens that had shown only a weak *in vitro* reaction both qualitatively and quantitatively in spite of heavy repeated immunizing doses, failed to produce any demonstrable resistance when passively transferred to young susceptible ones.

The protection conferred upon susceptible chickens by transfer of serum from resistant ones indicates that antibodies play a role in the mechanism of immunity in chickens to *Ascaridia galli.*

II. Chickens of different ages were infected with graded single doses of from 1,000 to 35,000 embryonated eggs of *Ascaridia galli.* Increases in the size of the infective dose brought about a decrease in the percentage development of the worms resulting therefrom. This appeared to be true in very young chickens with a great degree of susceptibility to infection and in older and more resistant ones. It also held for chickens which were necropsied as early as 3 weeks and as late as 3 months after infection.

Chickens between 2 and 35 days of age were given very heavy single infections. This caused the death of a total of 76. For each age group the average lethal dose was determined. Death occurred in all groups between 6 and 19 days after infection, with an average of 11·6. This is the time of greatest larval penetration in the intestinal mucosa. In chickens that succumbed to the infection, the percentage recovery and the average length of the worms was greater than that in those which, because of lower infective doses, had survived. Larger numbers of eggs per gram of body weight were required to kill older chickens.

The regularity of the results suggests the possibility of using lethal infections as an additional tool for the determination of the degree of resistance in different groups of chickens.

See also absts. **2206** and **2207** (ascaris antigens); **2215** (filariasis); **2341** (in Australia); **2345** (veterinary clinical parasitology).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

MULLIGAN, R. M. (1949.) **Primary liver-cell carcinoma (hepatoma) in the dog.**—*Cancer Res.* **9.** 76–81. [Author's summary copied *verbatim.*] **2232**

A review of the literature revealed 35 cases in the dog of carcinoma, presumably of liver-cell origin; eight of adenocarcinoma, evidently of intrahepatic bile duct origin; and two hepatic cancers not studied histologically. Data on age, sex, and breed were too incomplete to be conclusive.

In a group of four cases of hepatoma in the dog, inappetence, vomiting, weight loss, emaciation, and an upper abdominal tumor were symptoms noted 1–6 months before euthanasia. Resection of one hepatoma was successful and probably would have resulted in complete cure if the dog had been allowed to live. Resection might have been curative in two of the other three dogs with hepatoma if operation had been made earlier.

Three of the hepatomas arose from the inferior surface of the liver near the mid-line, displaced adjacent organs and tissues weighed 585–1,550 gm., were separated from the liver by fibrous connective tissue or directly impinged on compressed liver parenchyma, consisted of large soft to firm, tan, light-brown, tan-red, or dark-red lobules divided into nodules 2–55 mm. in diameter. The fourth hepatoma was associated with advanced cirrhosis of the liver and with atypical proliferation of bile ducts and sinusoids. The dog affected had had severe icterus during life. Microscopically, the lobules of hepatoma consisted of very large neoplastic liver cells in solid masses intimately related to proliferated vascular spaces resembling sinusoids. Portal triads were entirely lacking within the lobules of the hepatoma. The neoplastic cells had granular or vacuolated acidophilic cytoplasm and round or oval nuclei varying greatly in size, fairly frequently numbering two to a cell, displaying occasional mitosis, and supplied with beaded irregular chromatin and large acidophilic nucleoli. No case showed metastasis.

Ten cases of nodular hyperplasia of liver cells were compared with the four cases of hepatoma. The nodules were usually multiple, fairly firm, tan, red, red-tan, or dark red, and were 5–25 mm. in diameter, or varied extremely from 1–60 mm. Microscopically, the liver tissue around the single nodules was compressed, but fibrous connective tissue was not increased. The nodules consisted of irregular liver lobules with retention of central veins and portal triads in each lobule. The polyhedral cells within the nodules were arranged in cords one to many cell layers thick, with distortion of the intervening sinusoids. The cells of the nodules were smaller in both cytoplasmic and nuclear volume and exhibited less histologic evidence of nuclear activity than did the neoplastic cells of the hepatomas.

Both hepatoma and nodular hyperplasia of liver cells occurred in dogs in advanced senility or 11–16 years of age. Sex preponderance was not striking in either condition, and data on breed were inconclusive.

GARDNER, W. U., & PAN, S. C. (1948.) **Malignant tumors of the uterus and vagina in untreated mice of the PM stock.**—*Cancer Res.* **8.** 241–256. [Authors' summary copied *verbatim.*] **2233**

Thirteen tumors of the uterus or vagina appeared in 56 female mice of one stock. Five of the tumors were carcinomas of the vagina or uterine cervix; 7 were malignant tumors composed of undifferentiated cells, probably of epithelial origin, and one a spindle-cell sarcoma.

Mice of this stock showed low fertility, and two females had incompletely developed vaginas. The fertility decreased with continued inbreeding and the incidence of tumors increased.

HUTT, F. B., & COLE, R. K. (1948.) **The development of strains genetically resistant to avian lymphomatosis.**—*Off. Rep. 8th World's Poult. Congr., Copenhagen. Vol. I.* pp. 719–725. [English, French & Danish summaries. English summary copied *verbatim.*] **2234**

It has been demonstrated over a period of 12 years that selective breeding offers an effective method of controlling losses from avian lymphomatosis. In two lines bred for resistance, mortality from neoplasms was gradually reduced from approximately 15 per cent to approximately 5 per cent in the population hatched in 1946. At the same time and under identical environmental conditions, mortality from neoplasms in the line bred specifically for susceptibility to disease increased from the 15 per cent level to over 39 per cent.

The importance in such breeding of providing for adequate exposure to conditions responsible for avian lymphomatosis is emphasized.

The data also show that a breeding program

designed to control avian lymphomatosis can be combined with other objectives so that the resultant populations are not only more viable, but also more productive.

WILLIAMS, T. H. (1948.) **Sulpha granuloma. A new pathological entity.**—*Canad. med. Ass. J.* **59.** 50–52. 2235

Sulphanilamide or sulphathiazole in powder form is insoluble in tissues in some human beings. When incisions which have been treated with these drugs subsequently break down, "sulpha granuloma" should be suspected.—P. J. G. P.

TAYLOR, A., CARMICHAEL, N., & NORRIS, T. (1948.) **A further report on yolk sac cultivation of tumor tissue.**—*Cancer Res.* **8.** 264–269. [Authors' summary copied *verbatim.*] 2236

A report is made of the yolk sac technic of growing tumor tissue as modified by experience with hundreds of thousands of egg inoculations. Details are also given of a C3H mammary carcinoma which grows with unusual vigor in the egg environment. In a series of 15 experiments totalling 485 eggs, this tumor averaged 2·9 gms. 13 to 14 days after implantation in the egg.

BURMESTER, B. R., & COTTRAL, G. E. (1947.) **The propagation of filtrable agents producing lymphoid tumors and osteopetrosis by serial passage in chickens.**—*Cancer Res.* **7.** 669–675. [Summary & conclusions copied *verbatim.*] 2237

The filtrable agent or agents inducing osteopetrosis and lymphoid tumors of the viscera were propagated through 6 serial passages in chickens. The incidence of tumors and average survival time were quite uniform for the several filtrate inoculations and passages. An average of 81 per cent of all birds inoculated showed some gross involvement and they died on the average in 137 days. Of the total positive cases 55 per cent had osteopetrosis, 87 per cent had visceral tumors, and 6 per cent had neurolymphomatosis.

Results obtained from inoculation of chicks with tumor cell suspensions and filtrates prepared from the same tissue suggest that there was no relation between the malignancy of the tumor cells and the virulence of the agent. After the first passage, filtrates were as effective as cell suspension in producing visceral tumors, and the filtrates invariably produced a higher incidence of osteopetrosis. Filtrates appeared to be about as effective by the intraperitoneal route as by the intravenous route. Filtered plasma of tumor-bearing birds produced about as high an incidence of tumors in recipients as did filtrates of lymphomatous livers. Neurolymphomatosis appeared in 8 of 15 groups inoculated with filtrates but the incidence was not significant.

Donors showing only osteopetrosis produced about the same incidence of visceral tumors and osteopetrosis in recipients as donors with only lymphomatous visceral tumors or those with a combination of the two manifestations.

Conclusive evidence is presented that this lymphoid tumor contains a propagative agent or agents that will pass through bacteria-retaining filters and will induce a high incidence of osteopetrosis and visceral tumors in chickens within 6 months' time. The latter tumors have thus far been indistinguishable from the tumors seen in cases of naturally occurring visceral lymphomatosis.

HOLMGREN, H., & WOHLFART, G. (1947.) **Mast cells in experimental rat sarcomas.**—*Cancer Res.* **7.** 686–691. [Authors' summary copied *verbatim.*] 2238

Experimental sarcomas in white rats produced by carcinogenic substances regularly contain mast cells. In such sarcomas of fibroplastic type the development of mast cells can attain an extreme degree. The mast cells present in experimental sarcomas seem to develop locally in the connective tissue of the tumors, and this suggests that they take part in the reaction of the system against the tumor cells. Within the necrotic tumor areas the mast cells are frequently well preserved, a fact that seems to point to these cells possessing a greater power of resistance than the tumor cells.

LARSSON, L.-G., & SYLVÉN, B. (1947.) **The mast cell reaction of mouse skin to some organic chemicals. I. Estimation of the relative number of mast cells in normal mouse skin.**—*Cancer Res.* **7.** 676–679. [Authors' summary copied *verbatim.*] 2239

In the interscapular skin areas on the dorsum of mice of different age groups, the individual variations in the number of dermal and hypodermal mast cells were found to be so large that it proved impracticable to determine an average standard number. On the other hand, in each individual the numbers of mast cells were found to be about the same in symmetrical skin areas. Using this fact, two simple methods are described for the quantitative assay of the *relative* number of mast cells in thin tissue sections (10μ). The methods afford ample possibilities for studying the mast cell reactions to different experimental agents, provided that counts for absolute cell numbers per tissue unit are not attempted.

KRITZLER, R. A., MULLIKEN, B., & TURNER, J. C. (1949.) **Histological appearance of mouse sarcoma 180 infected by vaccinia virus.**—*Cancer Res.* **9.** 74–75. [Authors' summary copied *verbatim.*] 2240

Transplants in mice of mouse sarcoma 180,

parasitized by vaccinia virus and found to grow less well than control transplants, revealed no Guarnieri or elementary bodies in the tumor cells or surrounding stroma. In infected tumors there was no inflammatory reaction which might be attributed to the presence of the virus.

The differences observed between infected and non-infected tumors were quantitative rather than qualitative. Mitotic figures in infected tumors were fewer than in control tumors during the first 10 days after transplant. Variations in differentiation occurred in control and infected tumors but were more common in the latter.

See also absts. **2075** and **2076** (granuloma).

NUTRITIONAL AND METABOLIC DISORDERS

NATH, H., BARKI, V. H., SARLES, W. B., & ELVEHJEM, C. A. (1948.) **Microorganisms in the cecal contents of rats fed various carbohydrates and fats.**—*J. Bact.* **56.** 783–793. [Authors' summary copied *verbatim.*] **2241**

For animals on a lactose diet the total aerobic and anaerobic plate counts, as well as the numbers of coliforms and lactics, were much higher than the corresponding counts or numbers of the same organisms in the cecal contents of animals on diets containing either dextrin or sucrose. Compared to sucrose, dextrin was found to favor higher numbers of coliforms in the cecum. The ratio of the aerobic to the anaerobic plate count was highest on a dextrin diet and lowest on a lactose diet. The aerobic and the anaerobic plate counts, as well as the numbers of coliforms, were found to be decreased in the ceca of most of the rats fed sucrose diets containing a high level of corn oil. Supplementation of a high corn oil sucrose diet with "reticulogen" tends to counteract the inhibitory action of corn oil upon the growth of certain cecal microorganisms.

JOHANSON, R., MOIR, R. J., & UNDERWOOD, E. J. (1949.) **Sulphur-containing amino-acids in the rumen bacteria of sheep. [Correspondence.]**—*Nature, Lond.* **163.** 101. **2242**

Bacteria from the rumens of sheep reared under "green fed" and "dry fed" conditions were found to contain respectively 9·62% and 8·78% of N., of which cystine plus cysteine N. was 1·5% and 1·63% and methionine N. 1·54% and 1·18% respectively. The significant difference in methionine content was considered to be due to either an effect of the diet on the bacterial proteins independent of bacterial type, or to differences in the types of organisms or a combination of both. The comparatively high content of the two amino acids in the bacterial protein was related to the theory that dietary N. is converted to bacterial protein prior to digestion and absorption.—J. R. PICKFORD.

HANFSTINGL, J. (1949.) Wasserferkel und Myxoedemproblem. **[Dropsy in piglets and the problem of myxoedema.]**—*Tierärztl. Umsch.* **4.** 101–103. **2243**

In H.'s opinion, dropsy in new-born piglets in the form of congenital myxoedematic changes of the soft parts seems to be connected with hypothyroidosis of the dam, caused probably by a constitutional thyroid insufficiency as the result of lack of iodine.—E. G.

DRAKE, T. G. H., JACKSON, S. H., TISDALL, F. F., JOHNSTONE, W. M., & HURST, L. M. (1949.) **The biological availability of the calcium in bone.**—*J. Nutrit.* **37.** 369–376. **2244**

Two groups of three human beings were fed a calcium deficient diet; one group received a supplement of dried skim milk and the other bone meal, both supplements giving the same calcium intake. Results indicated that the availability of calcium from bone is comparable to that from milk. In a similar experiment using six young rats the calcium retention from bone was found to be about 90% of that from dried whole milk. —J. R. PICKFORD.

KRAATZ, C. P., & GRUBER, C. M. (1949.) **The effect of choline-deficiency on uterine activity of rats.**—*Science.* **109.** 310–312. **2245**

Six lactating and ten non-lactating rats were divided into three groups and one was fed on dog chow, the second on a basal choline-deficient diet and the third on the same basal diet plus 30 mg. of choline every second day. Some of the rats on the basal diet also received 1 g. dried yeast and 5 g. casein every second day. Vaginal smears indicated regular four-day oestrous cycles in all non-lactating rats and continuous dioestrous smears in all lactating rats. The rats were killed after 39 days and a segment of the uterus when placed in Locke's solution had spontaneous contractility and normal reactivity to hormonal and humoral agents in all cases. The average uterus weight for the lactating group was 268 mg. against 446 mg. for the non-lactating group; in the former group there was a loss and in the latter a gain in weight.—J. R. PICKFORD.

LEARY, T. (1948.) **Crystalline ester cholesterol and atherosclerosis.**—*Arch. Path.* **47.** 1–28. [Author's summary copied *verbatim.*] **2246**

Visual evidence is presented which, added to the data already published, indicates that atherosclerosis is a metabolic disease; that the relation of crystalline ester cholesterol to the lesions is as

specific as is that of the tubercle bacillus to tuberculosis; that the focal character of the disease and the localization of its lesions are due to the crystalline esterification of excess cholesterol (in whatever form it is ingested) in the liver and the scavenger action of Kupffer cells in removing that excess from liver cells, transporting it into the circulation and depositing it in the sub-endothelial layer of the arterial intima in regions where the cholesterophages can make contact with the arterial intima.

See also abst. **2341** (toxaemic jaundice).

DYE, J. A., & MCCANDLESS, E. L. (1948.) **A physiological approach to the problem of ketosis. I. Basic features of the metabolic processes concerned in ketosis.**—*Cornell Vet.* **38.** 331–340. **2247**

The literature on this subject is reviewed and discussed.—J. R. PICKFORD.

DISEASES, GENERAL

ANON. (1948.) **Hyperkeratosis or X disease or maybe XX disease. As described in the quarterly issue by the Animal Pathology Exchange, College of Agriculture, University of Illinois.**—*Texas vet. Bull.* **10.** No. 11. p. 4. **2248**

This is a short account of the symptoms, lesions and diagnosis of this cattle disease of unknown aetiology [see *V. B.* **18.** 211].—M. C.

LESLIE, V. J. S. (1949.) **Fog fever.**—*Vet. Rec.* **61.** 228–229. **2249**

A note on the symptoms and gross pathology of acute pulmonary emphysema as seen in L.'s practice in Yorkshire during the last four or five years. Treatment was unsatisfactory.—J. S.

PULLAR, E. M. (1948.) **Infectious pneumonia of pigs. I.—General description, differential diagnosis and epidemiology.**—*Aust. vet. J.* **24.** 320–330. **2250**

An infectious pneumonia of pigs which occurs very commonly in Victoria is described. Over a period of 11 years approximately 90% of all quarantine notices served for pig diseases were on account of this disease. 59% of 2,252 pig specimens submitted during a period of nine years were diagnosed as cases of this infectious pneumonia.

The aetiology is unknown but the disease is infectious and has been transmitted experimentally. *Pasteurella suiseptica* and *Salmonella suipestifer* were the pathogenic organisms most commonly isolated from lesions, although 5–10% of cases were sterile. Salmonella were present only when the pneumonia was accompanied by infection of the alimentary tract by these organisms.

The disease is characterized by a catarrhal pneumonia, particularly affecting the apical and cardiac lobes. A detailed description of the syndrome and lesions and the important points in differentiation from swine fever, swine plague, pneumonia, swine influenza, Glasser's disease, and pulmonary ascariasis are provided.

There is a marked increase in the number of cases in spring owing to the purchase of store pigs to dispose of the surplus skim milk. Many such pigs are sub-clinical cases from infected herds. In some cases the disease is introduced into herds by the acquisition of mature breeding stocks.

Control is difficult because of the impossibility of detecting sub-clinical cases.—D. C. B.

I. LUKE, D. (1948.) **Round heart disease in poultry.**—*Off. Rep. 8th World's Poult. Congr., Copenhagen. Vol. I.* pp. 692–696. [Danish & French summaries. English summary copied *verbatim.*] **2251**

II. WILSON, J. E. (1948.) **Round heart disease in poultry in Scotland.**—*Ibid.* pp. 697–702. [Danish & French summaries. English summary slightly amended.] **2252**

III. ADSERSEN, V. (1948.) **On the occurrence of the socalled Round Heart disease in Denmark.**—*Ibid.* pp. 702–708. [In English. Danish & French summaries. Abst. from English summary.] **2253**

I. Under the title of Round Heart Disease a serious disease of young poultry in Northern Ireland is described. The disease is characterised by sudden death and a hypertrophy of the heart muscle is the most prominent post mortem finding.

During 1946, 36 outbreaks of the disease were encountered involving 3,214 birds with an average death rate of 14·9%. In 1947 in 46 outbreaks, involving 3,938 birds, the average death rate was 16·1%.

The disease is not confined to any one breed and it does not appear to be infectious. No pathological organism has been found at post mortem examination and the condition has not been transmitted experimentally. The disease is comparable to a similar condition described in New Zealand by FISCHEL, in Germany by MATZKE and in Scotland by WILSON.

Treatment on non-specific lines seems to reduce the death rate but more research work is required in order to determine its etiology and to devise satisfactory methods of control.

II. The two outbreaks described in the paper were in a commercial flock involving White

Leghorns under one year old and in the flock of Brown Leghorns maintained by Dr. Greenwood at the Poultry Research Centre at Edinburgh, where the disease was most common in pullets but was recorded in chicks of 4 days old up to birds almost six years of age. In the first flock, cases first became numerous in 1942 and in the latter in 1943. There is a well marked seasonal incidence, cases occurring from January to April with a peak in February.

Affected birds are almost invariably in good condition. Egg production practically always ceases some time before death, the interval between cessation in egg production and death varying from 1–195 days; in about half of our cases it was between 4 days and 30 days.

Enlargement and alteration in the shape of the heart due to hypertrophy and dilatation of the left ventricle is striking. Affected hearts in the adult may weigh up to 26 grammes. In the young chick, enlargement is correspondingly great, the affected heart weighing up to 4 times that of the normal.

The microscopic picture is that of hypertrophy with secondary, patchy, diffuse, fatty degeneration of groups of fibres or individual fibres. Bacteriological examinations and transmission experiments have been uniformly negative.

The flock of Brown Leghorns has been closed for 17 years, the last male introduced being a Danish cock imported in 1931. In two lines carrying a high proportion of his blood the condition has been extremely prevalent in one, while in the other it has not been encountered.

There is a strong suggestion that the condition is hereditary and may be a simple recessive.

III. A survey is given concerning the occurrence of round heart disease in Denmark. Details are given of recorded outbreaks of the disease in January-April, 1948, in regard to size of flocks, mortality, and breed and age of the dead fowls.

With few exceptions the birds die suddenly. P.M. examinations reveal dilatation and hypertrophy of the heart, as well as a yellowish discoloration of its muscles as a result of fatty infiltration.

So far, it has not been possible to determine the cause of the disease. Bacteriological examination and inoculation of healthy birds have given negative results, and the experience gained in practice indicates that the disease is not of infectious or toxic origin. It is presumed that the disease results from a special disposition or hereditary condition.

GLOVER, J. S. (1949.) **Poultry disease problems in Ontario.**—*Canad. J. comp. Med.* **13.** 44–49. **2254**

A discussion of some of the poultry disease problems encountered in Ontario. Attention is drawn to some of the unsolved problems—well managed premises where mortality is quite high and yet no causative agent can be demonstrated. G. also discusses erysipelas in turkeys, coryza, fowl typhoid, pullorum disease, omphalitis, blackhead, coccidiosis, enterohepatitis, fowl pox and pullet disease (blue comb).—R. GWATKIN.

GORDON, A. J., HOLDER, E. C., & FEITELBERG, S. (1949.) **A quantitative approach to the study of splenomegaly.**—*Arch. Path.* **46.** 320–337. [Authors' final summary copied *verbatim.*] **2255**

A method is described for the quantitative estimation of the percentages of red pulp, white pulp and trabeculae of the spleen. The results for 30 " normal " spleens are compared with those obtained in 71 cases of splenomegaly classified pathogenetically. The different components are found to grow in different proportions in the various diseases. From these results certain inferences are drawn regarding the mechanism of splenic enlargement and the nature of the disease processes investigated.

FURUTA, W. J. (1949.) **Changes in the capsule of the lymph node in experimental hyperplasia.**—*Arch. Path.* **47.** 273–282. [Author's summary copied *verbatim.*] **2256**

The normal somatic lymph nodes of hamsters and rats possess a capsule which is relatively thin, compact and devoid of smooth muscle. At the hilus the capsule is areolar and contains lymphocytes which have infiltrated it from the medulla of the node. In hyperplasia the capsule shows areas of disintegration through which portions of the cortex extend out into the perinodal adipose tissue. Simultaneously large amounts of the medulla migrate peripherally as cords and islands into the surrounding areolar tissue of the hilus.

The capsules of the normal visceral lymph nodes of calves are extremely thick and contain abundant smooth muscle. However, at the hilus the medulla is covered by a loose structure which resembles areolar tissue, except that it exhibits strands of scattered smooth muscle and contains lymphocytes that have emigrated from the medulla. In the hyperplastic nodes the capsule of the cortex is resorbed in certain areas from its inner surface. The portion of the capsule just peripheral to the resorption is thin and contains small islands of lymphocytes and reticular cells. The destructive process also affects any trabecula located near the site of capsular erosion. Disintegration involving locally the entire thickness of the capsule has not been found. The hilar region shows a massive migration of medullary parenchyma which extends into the surrounding loose tissue.

HARRISON, H. E., BUNTING, H., ORDWAY, N. K., & ALBRINK, W. S. (1947.) **The pathogenesis of the renal injury produced in the dog by hemoglobin or methemoglobin.**—*J. exp. Med.* **86.** 339–356. [Authors' summary copied *verbatim.*] **2257**

Severe and persistent impairment of kidney function has been produced in dogs by intravascular hemolysis due to arsine, or by the intravenous injection of solutions of dog hemoglobin and methemoglobin.

The kidneys of these animals have been examined by the usual histological methods and also by means of the ferrocyanide histochemical method to determine the pathogenesis of the renal injury. These observations indicate that obstruction to flow of urine through the renal tubules is an important factor in the early reduction of kidney function. The material filling the lumina of the renal tubules was found to be chiefly methemoglobin in concentrated solution of gel-like consistency. No evidence of formation of a pigment insoluble at the pH of the urine such as hemochromogen or hematin was found. The cessation of urine flow is most readily explained by the increased viscosity of the tubule contents.

The intravenous administration of methemoglobin was found to produce more severe renal injury than the injection of equal amounts of oxyhemoglobin. Necrosis of the proximal convoluted tubule cells was present as a late lesion in animals injected with methemoglobin, large amounts of hemoglobin, or following extensive intravascular hemolysis. Such injury is probably a contributing factor in the persistent severe depression of renal function seen in these animals. Following disappearance of most of the intratubular pigment, a large number of collapsed tubules lined by hemosiderin-filled cells were found. The ferrocyanide histochemical studies indicated that these represented non-functioning nephrons although no obstructing intratubular material was present.

Direct measurements in two animals failed to reveal any reduction of renal blood flow following the injection of methemoglobin in amounts sufficient to produce renal injury.

See also absts. **2311** (goitre); **2312** (retinal atrophy).

POISONS AND POISONING

VISCONTINI, V. (1946.) Intoxication arsenicale d'un troupeau ovin consécutive au traitement des parasitoses internes et externes à l'aide de médicaments arsenicaux. [**Arsenical poisoning in a flock of sheep after administration of arsenic-containing parasiticides.**]—*Rev. Med. vet. Lyon et Toulouse.* **97.** 244–248. **2258**

Nine deaths in a flock of 24 sheep were reported, following a succession of antiparasiticidal treatments with an arsenic-containing anthelmintic (in powder form) and with Cooper's dip. The chronology of the treatments was:– the monthly treatment with the powder, 2nd July; first dipping with Cooper's dip of normal strength, 29th July; powder treatment, 2nd August; second dipping with half strength Cooper's dip, 12th August. Six deaths occurred on the 13th August after signs of prostration: shallow respirations, frothing of the mouth, grinding of the teeth and purplish colour of the gums. The quantities of arsenic found in the stomach contents were 0·3 mg. per 100 g. and in the viscera 1·5 mg. per 100 g.—H. PAVER.

SCHMIDT, H. W. (1947.) Obstbaumspritzung und Gesundheitswahrung bei Haustieren, Wild, Vögeln und Bienen. [**Fruit tree spraying and protection of the health of domestic and wild animals, birds and bees.**]—*Dtsch. tierärztl. Wschr.* **54.** 297–299. **2259**

Arsenic, dinitrocresol and nicotine are the chief poisons concerned and pastures must not be grazed for a few weeks, especially after heavy rain, when they should be free from the toxic effect of the treatment. S. recommends that nicotine should be sprayed in the evening, as it soon loses its toxicity, and that dinitrocresol should be used as a winter spray.—M. LATZKE.

DYRENDAHL, S., HANSEN, H.-J., & LANNEK, N. (1948.) Om råttgiftet Antu och akut Antuförgiftning hos hund. [**Poisoning of dogs with the rat poison antu (α-naphthyl thiourea).**]—*Skand. VetTidskr.* **38.** 193–212. [Abst. from English summary.] **2260**

The authors describe briefly the lethal doses for rats, the methods for laying the bait containing antu, its effect on rats and its danger to dogs.

They detail the results of observations on nine spontaneous cases of poisoning, following ingestion of rat baits. Eight of the nine died of dyspnoea as a result of severe pulmonary oedema. An experimental dog 18 months old and weighing 15 kg. was given a dose of 3·75 g. of 20% antu by tube into the full stomach and died within twelve and a half hours. In this case also the outstanding symptom was dyspnoea. A watery discharge from the nose was observed immediately after death. The electrocardiogram in this and in one of the spontaneous cases registered elevation of the S-T segment in the limb leads, disappearance of the R and appearance of an isolated S in

the chest lead. P.M., the blood was viscous, there was oedema in the lungs and mediastinum, there was hydrothorax and hyperaemia and in some cases oedema and haemorrhage in the parenchymatous organs, the gastro-intestinal mucosa and the brain and its meninges. Observations are recorded on the biochemistry of the pleural effusion.

The authors believe that the action of antu is confined to the endothelium of the pulmonary vessels. The occurrence of poisoning of dogs, especially in young ones, was higher than with other rat poisons.

[The authors refer to figs. 1 and 2 (X-ray pictures) which have not been printed.]—E. G.

BURTT, E. (1947.) **Exudate from millipedes with particular reference to its injurious effects.**—*Trop. Dis. Bull.* **44.** 7–12. **2261**

The carnivorous centipedes (Chelopoda) are provided with poison glands and can inflict painful bites. The millipedes (Diplopoda) on the other hand are vegetarians and cannot injure man or animals by biting, nevertheless they are recognized as injurious in some tropical countries. B. discusses the data on the subject. These creatures secrete a fluid with a repugnant smell and in some species the fluid may be ejected under pressure up to a distance of 33 inches. In certain species such fluids can cause injury to the eyes or by caustic action on the skin. Examples of both types of injury are quoted.—M. C.

GRASSET, E. (1947.) Le venin de *Bitis nasicornis*, son anavenin et préparation d'un sérum spécifique. **[The venom of *Bitis nasicornis* and the preparation of a specific antivenene.]**—*Soc. Belge Méd. Trop., Brussels.* **Dec.** 225–240. [Abst. in *Trop. Dis. Bull.* **45.** 540. (1948), copied *verbatim.* Signed: H. HAROLD SCOTT.] **2262**

Bitis nasicornis, Rhinoceros Viper, River-Jack, the Ihele or Bata of the Belgian Congo, exists over much of tropical Africa. The author has tested the toxicity of its venom on white mice, guineapigs, rabbits and pigeons, by various routes, intravenous, subcutaneous and intramuscular. Comparing it with the venoms of *B. arietans* and *B. gabonica*, it is less toxic than either to mice and guineapigs, but to rabbits it is equal to that of *B. arietans*, but less than that of *B. gabonica*, while in pigeons the toxicity is practically the same in all three. Death is preceded by increasing dyspnoea, convulsions and, at times, the passing of bloody fluid *per anum*, and at autopsy extensive haemorrhage is seen in all the organs. Animals which survive show extensive haemorrhagic oedema, necrosis and scarring at the site of inoculation. Antivenene is obtained by injecting horses with increasing doses of anavenom (venom plus formol) and a compound antivenene can be produced by inoculating with the venoms (or anavenoms) of *B. arietans*, *B. nasicornis*, *B. gabonica* and *Naja flava*, but the antitoxic action of the compound varies considerably. For example, 1 cc. of a product thus prepared neutralized respectively of the above 22, 9·5, 22 and 2 mgm.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

ROSE, C. L., HARRIS, P. N., BEHRENS, O. K., & CHEN, K. K. (1949.) **Pharmacology of allylthiomethyl- and *n*-butylthiomethylpenicillin.**—*J. Lab. clin. Med.* **34.** 126–132. [Authors' summary copied *verbatim.*] **2263**

Allylthiomethylpenicillin (AT) and *n*-butylthiomethylpenicillin (BT) are much less toxic than penicillin G (benzylpenicillin) when applied directly to the central nervous systems of mice, rabbits, and dogs.

The toxicity of penicillins AT and G in nervous tissue is reduced approximately fivefold by the intravenous administration of Sodium Amytal. The median lethal dose of penicillin BT, the least toxic of the group, is not affected by the use of the same barbiturate.

Necrosis of the ganglion cells occurs following lethal, intradural doses of each of the three penicillins.

The diffusion of penicillin appears to be much easier from the cerebrospinal fluid to the blood than in the opposite direction.

Sensitization has been shown in guinea pigs to penicillin G, but not to penicillin AT or BT.

WELD, J. T., & GUNTHER, A. (1947.) **The antibacterial properties of sulfur.**—*J. exp. Med.* **85.** 531–542. [Authors' summary copied *verbatim.*] **2264**

Saturated solutions of sulfur in alcohol (alcohol-sulfur) when diluted with broth are inhibitory to the growth of various Gram-positive bacteria and to *C. hominis*. By an arbitrary method of unitage with *S. aureus* as the test organism, our alcohol-sulfur contains 1,600 to 2,000 units per cc. and one unit contains between 0·24 and 0·34 gamma sulfur. The activity of a preparation is in general directly proportional to its sulfur content.

Solutions of sulfur in carbowax (carbowax-sulfur) when diluted with broth are likewise

inhibitory to the growth of various Gram-positive bacteria and to *C. hominis*. When *S. aureus* is used as test organism, 1 unit contains between 0·1 and 0·2 gamma sulfur. The activity of these preparations is also in general directly proportional to their sulfur content.

Carbowax-sulfur when incorporated in agar in 1–500 to 1–2,000 dilution inhibits the growth of various Gram-positive aerobic and anaerobic bacteria, *C. hominis*, and certain dermatophytes.

Our experiments appear to show that both alcohol-sulfur and carbowax-sulfur owe their inhibitory properties to the sulfur particles that are dispersed throughout the medium when these sulfur preparations are diluted with broth. The inhibitory effect of these particles may or may not be due to a combination of the sulfur particles with substances in the medium in which they are suspended.

Evidence suggests that the activity of both alcohol-sulfur and carbowax-sulfur is due to sulfur in the same form. The inhibitory effect is characterized by prolonged bacteriostasis with similar activity over a wide range of dilutions. There is no evidence of true bactericidal action even with the highest concentrations used.

SMITH, R. M., JOSLYN, D. A., GRUHZIT O. M., MCLEAN, I. W., Jr., PENNER, M. A., & EHRLICH, J. (1948.) **Chloromycetin: biological studies.** —*J. Bact.* **55.** 425–448. [Abst. from authors' summary.] **2265**

An unidentified *Streptomyces* has been isolated that produces an antibiotic substance called "chloromycetin". Antibiotic screening tests on solid and in liquid media are described. A turbimetric assay method, in which 50 per cent. inhibition of growth is the end point, has been developed.

Crystalline chloromycetin has been found *in vitro* to be inactive against yeasts and filamentous fungi, inactive against protozoa, moderately active against gram-positive bacteria and *Mycobacterium tuberculosis*, and active against gram-negative bacteria and *Borrelia recurrentis*. The crystalline antibiotic, *in vivo*, has afforded no protection against avian malaria in ducks, syphilis in rabbits, pneumococcus and streptococcus infections in mice, or against type A influenza, St. Louis encephalitis, and fixed rabies virus infections in mice or in eggs, but moderate protection against *Klebsiella* and *Shigella* infections in mice, and remarkable protection against *Rickettsia prowazeki* in chick embryos.

The toxicity of the antibiotic for laboratory animals is of the order of that of streptomycin. Although chloromycetin is only slightly soluble in water, it may be administered parenterally in propylene glycol solutions; oral administration is also possible, since it appears to be well absorbed from the gastrointestinal tract of the dog. After single doses in the dog, only small amounts of antibacterial substances are excreted in the urine, indicating inactivation in the body and perhaps excretion by other routes.

DUFRENOY, J., & PRATT, R. (1948.) **Cytochemical mechanisms of penicillin action. VII. Effects on activity of alkaline phosphatase.** —*J. Bact.* **56.** 99–105. [Abst. from authors' summary.] **2266**

A study was made of the distribution of phosphates, of aldehydes, and of alkaline phosphatase activity on different parts of penicillin assay plates seeded with *Staphylococcus aureus* or with *Bacillus subtilis*. Details are given of chemical tests.

Positive reactions for phosphates, for aldehydes, and for alkaline phosphatase activity were obtained throughout the uninhibited regions, and were most intense at the sites of the ring of enhanced growth which surrounds each inhibition zone and which corresponds to a region in which the cells are exposed to appreciable but subbacteriostatic concentrations of penicillin. Only negative tests were obtained within the inhibition zones.

Serial dilution studies with broth cultures confirmed the results obtained on assay plates.

RAKE, G., PANSY, F. E., JAMBOR, W. P., & DONOVICK, R. (1948.) **Further studies on the dihydrostreptomycins.**—*Amer. Rev. Tuberc.* **58.** 479–486. [Spanish summary. English summary copied *verbatim*.] **2267**

Pure preparations of streptomycin (streptomycin A), mannosidostreptomycin (streptomycin B) and dihydromannosidostreptomycin (dihydrostreptomycin B) have been compared. In accord with previously published data, it has been found that dihydrostreptomycin has biological properties closely resembling those shown by the parent streptomycin species. Only with the *in vitro* test, and there particularly with members of the genus *Salmonella*, have any striking differences been found between dihydrostreptomycin and streptomycin itself. It seems probable that *in vivo* differences between dihydrostreptomycin and streptomycin would be found only with *Salmonella* infections of those pathogens so far tested.

In vivo tests using a highly standardized tuberculosis infection in mice have not revealed significant differences in response when the variation between the doses used has been in 50 per cent increments.

See also absts. **2034** and **2035** (penicillin); **2038** (mastitis); **2062** (penicillin abscesses); **2063** (streptomycin); **2064** (assay of drugs); **2121** and **2122** (naganol in surra); **2126-2128** (trichomoniasis); **2130** (paludrine); **2133** (paludrine in anaplasmosis); **2185** (feline pneumonitis); **2210** (parasiticides); **2221** (cashew oil as anthelmintic); **2229** (sodium fluoride); **2235** (sulphonamide granuloma).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

ADRIAN, E. D. (1943.) **Afferent areas in the brain of ungulates.**—*Brain.* **66.** 89–103. [Abst. from abst. in *Biol. Abstr.* Sect. F. **19.** No. 2. p. 9. (1945).] **2268**

By recording the electrical activity of the cerebral cortex, the somatic receiving areas have been determined for the goat, sheep, pig, and horse. A detailed description of the method is given which differs from the usual one in that sound (loud speaker) was used instead of a graphic recording. In the case of the goat, lips and muzzle are represented generally ipsilateral, the limbs contralateral; in the sheep, lips and muzzle ipsilateral, limbs uncertain; in the pig, the snout occupies a large contralateral area; no areas for the tongue, lips, or other parts of the body could be determined; in the Shetland pony: contralateral, anterior representation of the muzzle, contralateral posterior representation of the limbs. Earlier results on the cat and ferret are compared with those obtained in the present investigation. The more complete cortical representation of the body in cat and ferret is ascribed to their discriminative movements in fighting. Contralaterality is explained as being a result of the influence of visual, decussating messages; homolaterality as being due to the prevalence of olfactory, uncrossed impulses.

BARRON, D. H. (1944.) **The early development of the sensory and internuncial cells in the spinal cord of the sheep.**—*J. comp. Neurol.* **81.** 193–225. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 2. 13. (1945), copied *verbatim.*] **2269**

The early development of the sensory and internuncial neurons of the spinal cord has been studied in sheep embryos impregnated with Ag. Sensory neurons are differentiating on the twenty-first day; a dorsal funiculus is present on the twenty-second; dorsal funicular collaterals enter the mantle on the 34th day. They are approaching the motor cells on the thirty-eighth. Commissural and funicular neuroblasts are present on the 21st day. The ventral funiculus is laid down on the 22nd and the lateral on the 24th. Both are ascending tracts when first formed. Commissural and funicular neuroblasts begin differentiating in the medullary epithelium. They are added to the mantle along with increasing numbers of indifferent cells. After the 34th day funicular and commissural neuroblasts differentiate in the mantle from indifferent cells. The most active center of differentiation corresponds to the distribution area of the dorsal funicular collaterals in the basal mantle. Collaterals from the funiculi and the commissure are present in the mantle on the 38th day. Attention is drawn to a number of cases in the development of the nervous system in which there is an association in space between the cell processes which invade areas occupied by indifferent cells and the onset of neuroblast differentiation in them. The suggestion is advanced that the growing processes may induce the indifferent cells to differentiate.

HEGAZI, A. (1949.) **The inferior buccal gland in the camel.**—*Vet. Rec.* **61.** 10–11. **2270**

H. briefly reviews the literature on the buccal glands in the camel and other domestic ungulates and then describes his findings of the inferior gland in 20 camels. It was found to occupy the space of the cheek between the buccinator muscle and mucous membrane extending the distance from the canine to last lower molar tooth. As compared with other species the gland is situated at a lower level on the horizontal ramus of the mandible. Histological examination demonstrated small lobular alveoli with a large amount of inter-lobular connective tissue interspersed with elastic fibres, whereas in other domestic animals the lobular alveoli are large and the inter-lobular connective tissue scanty.—C. W. OTTAWAY.

ELIAS, H. (1949.) **A re-examination of the structure of the mammalian liver. I. Parenchymal architecture.**—*Amer. J. Anat.* **84.** 311–333. [Author's summary copied *verbatim.*] **2271**

The conventional notion of the hepatic cord as a long, cylindrical structure is shown not to be tenable in 4 mammalian species, including man.

The mammalian liver is fashioned of cribriform sheets or plates (*laminae hepatis*), one cell thick. These sheets anastomose with one another and enclose between them spaces which contain the sinusoids. These spaces (*lacunae hepatis*), which form a continuous labyrinth (*labyrinthus hepatis*), are shaped like wide sacs with flexible walls in man and the cat. The liver of man and cat is therefore tentatively called a saccular liver (*hepar sacculare*). The spaces are narrow and cylindrical in the horse and rabbit, the liver of which is tentatively named a tubular liver (*hepar tubulare*). Intermediate types seem to exist in other mammals.

GRACE, W. J., SETON, P. H., WOLF, S., & WOLFF, H. G. (1949.) **Studies of the human colon: I. Variations in concentration of lysozyme with life situation and emotional state.**—*Amer. J. med. Sci.* **217.** 241–251. [Abst. from authors' summary.] **2272**

The concentration of the mucolytic enzyme, lysozyme, was measured in the stools of normal subjects and subjects with mucous and ulcerative colitis under a variety of circumstances and associated with widely varying life situations,

emotions and attitudes. It was found that transitory increase of lysozyme often occurred in the course of emotional reactions. In persons with ulcerative colitis the high values were found immediately to precede episodes of exacerbation of symptoms with bleeding.

HUGGINS, C., & MOULTON, S. H. (1948.) **Esterases of testis and other tissues.**—*J. exp. Med.* **88.** 169–179. [Authors' summary copied *verbatim.*] **2273**

The tissues most effective in the enzymatic hydrolysis of acyl esters of *p*-nitrophenol by tissue extracts of the rat and dog were the liver, lung, pancreas, renal cortex, and testis; in the dog tracheal and vesical mucosae were also esterase-rich and the lens had appreciable activity. Esterase was at low concentration in the tissues of the rat for 4 and 5 days after birth, but an increase to adult levels soon took place except in the testis where the rise was delayed until puberty. The esterase values of the blood of newborn children were also low.

Two patterns of activity in tissues against these esters were found. A pattern in which propionate esters were hydrolyzed most rapidly was displayed regularly by liver, lung, renal cortex and testis of the rat and also by dog, rabbit and human serum. A second pattern with progressive effectiveness in hydrolyzing fatty acid esters of 2-carbon to 5-carbon chain length was exhibited by the pancreas of the rat, rabbit, and dog and also by rat serum.

Esterase of the testis of the rat is located in the interstitial cells and its concentration seems to be directly related to androgenic hormone production. The increase of testicular esterase during puberty paralleled the increase of prostatic weight. Hypophysectomy caused a profound decrease of testicular esterase which was restored in part by gonadotrophin. Artificial cryptorchism in the rat, causing elimination of germinal epithelium, resulted in an increase of esterase concentration although the total content of the testis slowly decreased.

FLECK, L., & MURCZYNSKA, Z. (1949.) **The phenomenon of leukergy.**—*Arch. Path.* **47.** 261–272. [Authors' summary copied *verbatim.*] **2274**

Leukergy, the phenomenon consisting in clumping of leukocytes in cytologically homogenous groups shows two kinds of cytologic selectivity: (1) The degree of agglomeration of various kinds of white blood cells is different: *i.e.*, the percentage of clumped leukocytes, lymphocytes or monocytes varies in different cases. The clumping of neutrophils is most frequent. A differential method of evaluating the degree of leukergy is described. (2) The groups of cells show a remarkable cytologic homogeneity. This can be statistically proved.

Leukergy has no direct influence on phagocytosis. An indirect influence through the close contact of leukergic leukocytes with clumps of platelets, including bacteria, is discussed.

Leukergy can be positively induced by injection of gram-negative bacteria or their endotoxins. The effect of gram-positive bacteria is much weaker and less definite.

Increased salt concentration depresses the agglomeration of leukocytes, this action being similar to that on isoagglutination and heteroagglutination of blood cells.

I & II. SCHWARZ, E. (1948.) **Studies on the megakaryocyte. I. The normal granulopoiesis of the megakaryocyte. II. Deficient granulopoiesis in the megakaryocyte in essential thrombopenic purpura.**—*Arch. Path.* **45.** 333–341; & 342–353. [Author's summaries copied *verbatim.*] **2275**

I. Granulopoiesis begins in the megakaryoblast in a well defined, distinct area, for which the term "functional area" is proposed. The "functional area" is located near the indentation of the nucleus, at the site of the archoplasm. By concentric and continuous expansion it gradually involves the entire cytoplasm with the exception of a narrow border zone, which remains free of granulation. The granulopoiesis is monocentric. Granulopoietic foci independent of the primary area apparently never develop. The position and the growth of the "functional area" keep the nucleus in an eccentric position. Nuclear structures do not visibly participate in the formation of the granules.

II. A case of chronic essential thrombopenic purpura with exceptional changes of the megakaryocytes is described. Hyalinization and absence of the azurophilic granulation were the pathologic features.

The changes were followed from their beginning in the megakaryoblast throughout the development of the megakaryocyte. The changes were not due to a degenerative process but corresponded to a functional disturbance of granulopoiesis. The progressive stages of the disorder are in full agreement with those of normal granulopoiesis as it was analyzed in the foregoing paper.

The observed disturbance cannot be ascribed to a splenic factor or to damage caused by a toxin. A probable hypothesis assumes a deficiency of substances necessary for granulopoiesis.

Consequently, "essential" thrombopenic purpura splits into three types, not related to one another: (1) the common type with preserved granulopoiesis and partial influence of a splenic

factor; (2) a type of functional failure of granulopoiesis, probably in the nature of a deficiency; (3) a type with degenerative or destructive changes of cytotoxic origin.

QUICK, A. J., SHANBERGE, J. N., & STEFANINI, M. (1949.) **The role of platelets in the coagulation of the blood.**—*Amer. J. med. Sci.* **217.** 198–205. [Authors' summary slightly amended.] **2276**

A technique was devised for varying the number of platelets without otherwise altering the plasma.

The effect of the number of platelets was studied and the following observations made: (1) The greater the number of platelets the sooner clot retraction begins, and the smaller the final clot; (2) Clot retraction is characterized by a relatively long latent period followed by an accelerated phase and protracted completion; (3) Within a wide range in the number of platelets no significant change in coagulation time can be observed; (4) As the number of platelets is diminished the speed of prothrombin consumption is decreased, but within limits the final amount of prothrombin converted approximates a fixed value; (5) Below a critical number of platelets (which varies in different types of blood) the consumption of prothrombin stops after a relatively short time. This suggests that plasma contains an agent that inactivates the platelet enzyme; (6) In thrombocytopenic purpura of sufficient severity, the consumption of prothrombin may be markedly diminished. This constitutes important evidence that a serious defect in coagulation is present which has heretofore been unrecognized because it is masked by a normal coagulation time.

MOLE, R. H. (1948.) **Fibrinolysin and the fluidity of the blood** *post mortem.*—*J. Path. Bact.* **60.** 413–427. [Authors' summary copied *verbatim.*] **2277**

A fibrinolysin was demonstrated in over 90 per cent. of samples of fluid and incoagulable cadaver blood, all of which were free from fibrinogen.

The appearance of the lysin was considered to be part of the body's general reaction to injury. This accounted for its presence in the blood after death from a wide variety of causes, and for the frequency with which fluid and incoagulable blood was found at autopsy.

The fibrinolysin failed to appear after death from infections and cachexia, and this is the reason why in such cases the blood was found to be coagulated at autopsy.

The fibrinolysin is probably produced by the endothelial lining of the vascular channels and body cavities.

Cadaver fibrinolysin is a globulin with an optimum *p*H on the alkaline side of neutrality. Although it lyses fibrin it does not appear to affect fibrinogen.

Cadaver fibrinolysin differs from plasmin and the pancreatic proteinases, but may be related to the skin proteinase of Beloff and Peters and to the spontaneously active fibrinolysin of Macfarlane.

The possible physiological and pathological significance of fibrinolysin formation is outlined.

I. WUNDERLY, C., & LEEMANN, W. (1946.) Uber neue klinisch-chemische Untersuchungsergebnisse an Pferdeblut. I. Mitteilung. **[Clinical and chemical tests applicable to the blood of the horse. The nephelogram. I.]**—*Schweiz. Arch. Tierheilk.* **88.** 181–193. **2278**

II. LEEMANN, W., & WUNDERLY, C. (1946.) Uber neue klinisch-chemische Untersuchungsergebnisse an Pferdeblut. II. Mitteilung. **[Clinical and chemical tests applicable to the blood of the horse. Nephelogram and electrophoresis. II.]**—*Ibid.* 529–539. **2279**

III. WUNDERLY, C., & LEEMANN, W. (1947.) Uber neue klinisch-chemische Untersuchungsergebnisse an Pferdeblut. III. Mitteilung. **[Clinical and chemical tests applicable to the blood of the horse. Cadmium test, electrophoresis and nephelogram. III.]**—*Ibid.* **89.** 373–383. **2280**

I. The authors studied non-specific tests that can be used as aids in diagnosis of virus diseases and secondary anaemias in horses. Nephelograms are obtained by plotting a curve of turbidity measurements against different dilutions of sera with $CaCl_2$; as compared with a curve prepared for healthy human beings, the threshold value of such a curve for healthy horses is displaced to the left, *i.e.*, in the direction of greater concentration. The procedure for obtaining the nephelogram is given in detail. The cadmium reaction and the blood picture are also dealt with and the value of all these methods is compared, based on an investigation on 29 healthy and 171 diseased horses. [The cadmium reaction: 0·4 ml. blood serum, used 20 hours after sedimentation, is placed in each of two test tubes. To the first is added drop by drop, a 4% solution of $CdSO_4$ until a distinct cloudiness is obtained, the number of drops being noted. To the second four drops of $CdSO_4$ are added; the mixture is well shaken and allowed to stand for 15 min., the result being estimated by the amount of turbidity formed.] The nephelograms of the diseased horses were always displaced to the right, whereas for diseased human beings and cattle they are displaced to the left.

II. The authors describe six further horse cases of catarrh of the respiratory organs or

anaemia in which continuous serum tests were made with the nephelogram during treatment, the results being compared with the conclusions reached by clinical examination.

The nephelogram was not of diagnostic value in these cases. A single examination of serum gives no indication of the course of the disease and it is therefore necessary to make at least 2–3 examinations at intervals of 3–4 weeks. In by far the greater number of cases the curve of the nephelogram, for diseased horses, is displaced to the right, *i.e.*, turbidity is obtained with the weaker solutions of serum. From results obtained by estimation of the α, β, and γ-globulin in the sera by electrophoresis it was found that this displacement of the curve to the right was coincident with an increase in γ-globulin.

III. Electrophoresis diagrams of the sera of seven horses, one healthy and one case each of brucellosis, hepatitis, broncho-pneumonia, inflammation, anaemia and pleuro-pneumonia are shown together with corresponding nephelograms and results of cadmium tests made at the same time. It was ascertained that the displacement of the nephelogram curve to the right, as found also in previous investigations, coincided with an especially high γ-globulin content of the serum, as determined from the electrophoresis diagrams, which was also taken to be the cause of the strongly positive cadmium reaction.—E. V. L.

JIŘINA, K. (1947.) Reakce k hodnocení funkce jater u koní. **[A reaction to assess liver function in the horse.]**—*Čas. československ. Vet.* **2.** 108–110. **2281**

Horses used for the production of serum are often affected by dysfunction of the liver. J. describes the use of the Takata reaction modified by Gros (a mercuric chloride precipitation test) to assess liver function. In 48 healthy horses permanent turbidity occurred after 2·8–4·6 ml. of the prepared solution had been added; in 23 samples of serum from horses producing antidiphtheritic and antitetanic serum the turbidity occurred after 0·7–12·7 ml. of the solution had been added. J. concludes that a negative test is given in the serum of horses with intact or slightly affected liver, positive results being obtained with serum of horses with amyloid degeneration of parenchymatous organs, pneumonia, etc.

[The results do not agree with the experiments of Wunderly & Leemann [see preceding absts.] who found that the Takata reaction in the blood serum of healthy horses may be positive and is therefore of no value.]—E. PŘIBYL.

MENG, H. C., & FREEMAN, S. (1948.) **Experimental studies on the intravenous injection of a fat emulsion into dogs.**—*J. Lab. clin. Med.* **33.** 689–707. [Authors' summary copied *verbatim.*] **2282**

Stable, fine fat emulsions were prepared using Span 20 (0·5 per cent), Asolectin (0·4 per cent), and sodium cholate (0·1 per cent) as emulsifying agents homogenized with refined butter oil (10 per cent) by means of a high-pressure Viscolizer.

Fat emulsions (in five dogs) and emulsifying agents alone (in three dogs) caused no fall in blood pressure. In the same animals, urine and bile secretions were increased.

The thoracic duct lymph flow increased following injection of fat emulsion, emulsifying agents, and 10 per cent dextrose solution. The total output of lymph lipids was increased following injection of fat emulsion, but not following the emulsifying agents.

The daily intravenous infusion of emulsifying agents to dogs for four weeks failed to reveal toxic effects.

The daily intravenous infusion of 10 per cent butter oil emulsions to dogs fed a fat-free diet resulted in further gain in weight and positive nitrogen balance similar to that of the control period.

Serum total fatty acids were markedly increased following fat injection. The increase of serum total cholesterol and phospholipids was comparatively slight. The serum lipids disappeared from the blood stream within seventeen hours after injection. No appreciable increase of serum lipids resulted following infusion of emulsifying agents alone.

Histologic examinations of the liver and kidney of dogs infused with the emulsifying agents showed normal structures. Of two fat infused dogs, one showed essentially normal lungs, liver and kidney, while the other showed fat granules in the liver cells.

LARDY, H. A., GHOSH, D., & PLAUT, G. W. E. (1949.) **A metabolic regulator in mammalian spermatozoa.**—*Science.* **109.** 365–367. **2283**

A metabolic regulator, resembling dinitrophenol in that it stimulates cellular respiration and aerobic glycolysis while preventing energy utilization, is described. The metabolism of epididymal spermatozoa in the presence of added regulator, closely resembles that of ejaculated spermatozoa. Anaerobic glycolysis is usually depressed by the regulator, especially at higher concentrations.

An assay for the regulator was worked out. This is based on its ability to stimulate the rate of aerobic fermentation by baker's yeast. The regulator is present in an inactive form in freshly ejaculated bull spermatozoa. The active form is liberated during storage or more rapidly by mild alkaline hydrolysis. The increased rate of

respiration of epididymal spermatozoa following storage is probably due to liberated regulator. If the liberation of the regulator can be prevented, or the regulator controlled when liberated, viable spermatozoa might be preserved for longer periods than are possible at present.—JAS. G. O'SULLIVAN.

NICHOLS, J. (1948.) **Effects of electrolyte imbalance on the adrenal gland.**—*Arch. Path.* **45.** 717–721. [Author's summary copied *verbatim.*] **2284**

Evidence is presented which indicates that the outer zones of the adrenal gland are closely connected with the regulation of electrolyte balance.

LEVANDER, G. (1949.) **On tissue induction.**—*Acta path. microbiol. scand.* **26.** 113–141. [In English. Author's summary slightly amended.] **2285**

When investigating the causal aspect of a healing process, the first and most important question is to decide whether the regeneration emanates solely from the old tissue or whether some other material may also play a rôle. The most suitable method for settling this question is implantation. It is of the utmost importance here to study the implantation preparations very carefully during the first few stages immediately after transplantation.

Implantation of the various skeletal layers—the mesenchymal growth zone, hard bone and bone marrow—showed that the graft dies shortly after transplantation, *i.e.* within 2–3 days. New bone is not formed until 4–6 days after implantation. This osteogenesis arises through a differentiation of the mesenchymal tissue which forms on the site of implantation.

Since it is clearly not a question of direct cellular proliferation from the graft into the surrounding medium, the author explains the osteogenesis by assuming the existence of a substance which is liberated from the bone tissue and bone marrow, and which passes over into the surrounding medium where it activates the newly formed pluripotent mesenchymal tissue into forming bone. That such a substance actually exists has been proved by experiments with alcoholic extracts—totally free from cells—of bone tissue and bone marrow (*Levander*, *Annersten*, *Bertelsen*, *Lacroix*, *Willstaedt*).

The author considers that striated musculature also regenerates from a mesenchymal blastema. After injection of alcohol into musculature, a rich growth of mesenchymal tissue occurs around the musculature which is damaged by alcohol. In this mesenchymal medium grow young muscle rudiments which have no apparent connection with the original musculature. After implanting muscle, one can observe that the implantate dies and that the new musculature is differentiated out in the surrounding mesenchymal tissue.

The author compares these reactions, where an originally non-specific mesenchymal tissue differentiates in a specific direction, with embryonic *induction.* Induction would mean in the regeneration of tissue that a factor which is necessary for the specific differentiation, can be liberated from a tissue and pass over into the surrounding medium where it induces a pluripotent mesenchymal tissue in a specific direction. There is every reason for thinking that this factor will ultimately be identified as a definite chemical substance.

The theory of direct cellular proliferation does not, for example in implantation experiments, give us a regeneration mechanism in the true sense of the word. It only states that certain cells can maintain their vitality after transplantation and continue to live in the new medium. According to the induction theory, on the other hand, the process is really one of *regeneration*, *i.e.* an entirely new material is formed in the fully-developed organism independently of the actual mass of old tissue. This means that even in the fully-developed organism, differentiation of an originally non-specific medium takes place just as in embryonic development. In other words, regeneration is a repetition of the reactions which take place during the foetal stage. Induction explains only the specific differentiation. We still do not know how the actual mass of tissue arises during regeneration.

NICKEL, R. (1947.) Topographie des Widerristes. **[Anatomy of the withers.]**—*Dtsch. tierärztl. Wschr.* **54.** 357–361. **2286**

Following a general review of the topographical anatomy of the withers of the horse, in which he discusses the directive movement of the scapula on the body at various paces, N. refers particularly to the synovial bursae and cervico-thoracic fasciae in relation to the pathology and surgery of fistulous withers.

Of 14 horses examined, in only four was a bursa found interposed between the atlas and the ligamentum nuchae (the atlantal bursa), in none between the axis and the ligamentum nuchae, while the bursa between the spines of the second and third thoracic vertebrae and the expansion of the funicular band of the ligament (supra-spinous bursa) was present in all cases. The inconstancy of these bursae in normal animals suggests that, as with some subcutaneous bursae, they appear only as a result of pressure and are therefore strictly pathological in nature. The bursa of the withers (supra-spinous) is actually situated between the ligamentum nuchae and the spinocosto

transversalis fascia (dorso-scapular ligament of Sisson). This fascia is partly elastic and extends over the withers; on either side, below the level of the bursa, it divides into several lamellae which intersect the muscles in the subscapular region. In cases of fistulous withers where the pathological process extends beyond the limits of the bursa it is along these fascial planes that pus will accumulate. N. stresses the importance of avoiding section of this fascia in operative surgery for the relief of uncomplicated cases of bursitis and peribursitis and of appreciating the confined pathways of extension for the pathological process in chronic cases.—C. W. OTTAWAY.

HÖFLIGER, H. (1948.) Situs inversus beim Pferd. Zum Problem der Asymmetrie. [**Anatomical asymmetry in horses.**]—*Schweiz. Arch. Tierheilk.* **90.** 250–266. **2287**

A case of anatomical asymmetry in a horse prompted H. to review the problem of cause and effect of this condition. In the case described, the carcass was not examined until the intestines had been removed, but the stomach and spleen were situated on the right hand side of the liver, which was itself mirror-imaged, and examination of the arterial and mesenteric roots suggested a reversal of the intestines. The contents of the thorax had similar transpositions.

These cases can be classified as partial or complete, depending on the number of organs transposed. They are not common and although those involving unilateral structures are easily recognized, in bilateral structures more detailed examination is required. H. discusses the incidence of asymmetry in the limbs and endeavours to associate this with mode of progression. The literature reviewed, including that of experimental embryology, suggests that the change occurs at cleavage level and is not necessarily associated with a twinning process.—C. W. O.

BIBIĆ, C. (1941.) Prilozi razvoju koštane srži u ossa tarsi goveda. [**Development of the bone marrow in the tarsal bones of cattle.**]—*Vet. Arhiv.* **11.** 510–525. [Abst. from German summary.] **2288**

The initial development of the bone marrow begins earlier in the larger bones of the tarsus than in the smaller ones.

The earliest stage at which primary bone marrow was present in the fibular tarsal bone of the foetus was at the 15th week. Formation and development of blood cells begins at four and a half months and fat cells develop at six and a half months. The formation of blood-cells ceases three months after birth, while haematopoietic remnants are still to be found in the cartilage of the epiphysis in the 16–17-month-old individual.

In the tibial tarsal bone the formation and development of blood cells begins in the foetus at six and three-quarter months, fat cells appear at the eighth month of foetal life and formation of blood cells ceases five months after birth.

In both components of the fused central and the fourth tarsal bones the beginning of haematopoiesis can be established in the eight-month-old foetus, the appearance of fat cells about 14 days later and cessation of development of blood cells at the sixth month after birth.

In the first and the fused second and third tarsal bones the formation of blood cells begins simultaneously in the eight-month-old foetus and ceases eight months after birth.

Peripheral haematopoietic remnants may still be found in the fused second and third tarsal bones of 10–12-month-old individuals and in exceptional cases in the first tarsal bone of 17–18-month-old individuals.

The number of fat cells increases steadily and fat cells become predominant when haematopoiesis ceases, so that pure fat marrow is found in the bones.—F. E. W.

PAULING, L. (1948.) La structure des anticorps et la nature des réactions sérologiques. [**The structure of antibodies and the nature of serological reactions.**]—*Bull. Soc. Chim. biol. Paris.* **30.** 247–259. [Abst. in *Bull. Hyg., Lond.* **24.** 95. (1949), copied *verbatim.* Signed: N. V. STACK.] **2289**

The subject is reviewed and discussed with the aid of diagrams. It is concluded that all biological specificity depends on complementary detail in molecular structure. Enzymes have patterns complementary to the molecular configurations intermediate between those of the reagents and reaction products of the processes catalysed. The resultant diminution in the energy of the activated complex, and therefore in the activation energy of the reaction, leads to an increase in the rate of transformation. While there is no convincing evidence on this subject, it is believed that the highly specific self-multiplication of virus species will be found to be due to these same molecular forces. While our general picture of some important biological processes has become clear, our present conception of the detailed structure of the substances involved remains vague.

See also absts. **2306** and **2307** (sex hormones); **2314** (oestrus cycle); **2347** (submicroscopic morphology of protoplasm and its derivatives); **2348** (crystalline enzymes).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

HELMHOLZ, H. F. (1948.) **Milk: a European child health problem.**—*Arch. Dis. Childh.* **23.** 149–155. [Abst. in *Bull. Hyg., Lond.* **24.** 65. (1949), copied *verbatim.* Signed: H. M. DAVIS. **2290**

The problem to be considered is the provision of a safe milk supply for the children of Europe. Prior to 1939, the milk supply of Europe was qualitatively inadequate owing to poor hygiene of production, bulk supply and the absence of cooling and pasteurizing plant. As a result of the war milk supply is now quantitatively inadequate, production having been reduced by roughly 50 per cent.

Figures from 17 European countries are tabulated to show the difference between the years 1937 and 1946 in total milk production, milk consumption for feeding calves, liquid milk for human consumption and milk used for butter, cheese and other products. In one country only, the United Kingdom, is the total milk production greater in 1946 than in 1937, and in two countries only, the Netherlands and the United Kingdom, is the figure for human consumption of milk higher in 1946 than in 1937. In Poland by 1946 milk production had fallen to one-third of the pre-war level. In all countries there is a marked drop in the quantity of milk used for butter and cheese production, and in all countries except the United Kingdom an increase in the milk fed to calves. This is due partly to the reduced daily production per cow owing to disease and lack of proper fodder, and to the fact that in some countries it has become more profitable to the farmer to give whole milk to livestock and to sell the animals for meat.

The problem of restoring and increasing the reduced milk supply of Europe must be met by importation of high-grade cattle, by combating disease, by teaching modern methods of care and feeding and by price adjustments of milk in relation to other food products. The quality of the milk can be improved by education of farmers and milk handlers in hygienic production, by pasteurization and refrigeration, and by production of unsweetened condensed or dried milk. In comparing the relative value of pasteurized and processed milk there can be no doubt that the processed milk is a safer product, which can be shipped and stored without danger and at a lower cost when produced on a large scale. Arguments are set out in favour of dried milk rather than evaporated milk, since there is less waste, the cost of shipping is lower and Europe is becoming educated to its use.

In conclusion it is stated that dried milk should prove to be the ideal cow's milk supply for the infants and children of Europe. Meanwhile all commercial fluid milk should be pasteurized, bottled and refrigerated until used, and in communities without pasteurization facilities milk should be boiled before use. Attention is drawn to the value of skimmed milk as a cheap protein food for children.

KETZ, A. (1948.) Grundsätzliches zur bakteriologischen Fleischuntersuchung. Eine Stellungnahme zu den Vorschlägen über die Änderung der Vorschriften für die bakteriologische Fleischuntersuchung. [**Bacteriology in meat inspection.**]—*Mh. Vet.-Med.* **3.** 101–109. **2291**

K. discusses proposals to modify the existing regulations regarding bacteriological meat inspection in Germany.—E. G.

ROMAN, E. E. (1947.) Estudio de la precipitation en el diagnostico diferencial de las carnes. [**The precipitin test in differential diagnosis at meat inspection.**]—*Rev. Med. vet., Bogotá.* **16.** 71–100. **2292**

A description of the precipitin test for detecting substituted meat. Horse and ass meat cannot be differentiated from each other. Antiserum for pig tissue operates at a titre of 1 : 10,000 and that for sheep tissue at 1 : 20,000. Heating the mixture to 65°C. delays or inhibits the precipitation. The results obtained with salted meat are variable.—R. MACGREGOR.

I. GROSS, C. E., VINTON, C., & MARTIN, S., Jr. (1946.) **Bacteriological studies relating to thermal processing of canned meats. IV. Viability of spores of a putrefactive anaerobic bacterium in canned meat after prolonged incubation.**—*Food Res., Ill.* **11.** 399–404. [Abst. in *Bull. Hyg., Lond.* **22.** 206. (1947), copied *verbatim.*] **2293**

II. GROSS, C. E., VINTON, C., & STUMBO, C. R. (1946.) **Bacteriological studies relating to thermal processing of canned meats. V. Characteristics of putrefactive anaerobe used in thermal resistance studies.**—*Ibid.* 405–410. [Abst. in *Bull. Hyg., Lond.* **22.** 206. (1947), copied *verbatim.*] **2294**

I. The presence of viable spores was demonstrated in cultures of tubes showing no visual spoilage after incubation for one year at 28°C. (82·4°F.). This was explained as inhibition of germination of the viable spores. The effectiveness of inhibition increased with an increased percentage of salt but was not completely effective in any case. The effect of nitrate and nitrite could not be clearly demonstrated and if the effect were positive it would be regarded as negligible compared with that of 3½ per cent. salt.

Dormancy of viable spores was evident especially at processing levels approaching destruc-

tion. Dormancy was observed even in the absence of secondary inhibitors, such as salt.

In all tubes containing salt the visual evidence of spoilage was noted only after several months' incubation. Viable spores were demonstrated at thermal-processing levels as much as eight F_0 units above those showing visual evidence of spoilage. These observations may be of considerable importance in their possible application to canning technology.

II. Putrefactive anaerobes S_2 and 9x isolated as the causative agents in spoilage of canned meats and S_2 used as a test organism in this series of investigations are shown to be culturally and serologically identical with P.A.3679, a test organism that has been frequently used by the N.C.A. laboratories for inoculated-pack studies.

Further, S_2, 9x, and P.A.3679 are shown to be culturally and serologically distinct from a strain of *Cl. sporogenes* (Spray).

The morphological and cultural characteristics of S_2, 9x, and P.A.3679 are described.

GROSS, C. E., & VINTON, C. (1947.) **Thermal death time of a strain of *Staphylococcus* in meat.** —*Food Res., Ill.* **12.** 188–202. [Abst. in *Bull. Hyg., Lond.* **22.** 785. (1947), copied *verbatim.* Signed: W. G. SAVAGE.] **2295**

Staphylococcus No. 184 was used; it is a producer of enterotoxin and responsible for food poisoning outbreaks. Heat-resistance was tested under a variety of conditions, mostly devised to correspond with practical working conditions in the conservation of meat products. The findings are recorded in relation to a special mathematical formula and cannot conveniently be summarized; for these the original paper should be consulted. Complete destruction of the organism was not only a factor of time and temperature, but was markedly influenced by many other considerations, such as the number of organisms present, the age of the culture and the nature of the meat medium. Very varied results were obtained according as these factors varied. For instance, previous growth of the staphylococcus in meat, such as ham, very markedly increased the time-temperature needed for destruction. The few experiments made showed that curing agents greatly increased thermal resistance. The paper shows very clearly how extremely complicated are the factors affecting the heat resistance of organisms in commercial meat products.

MINETT, F. C. (1945.) **Multiplication of *B. anthracis*, *Cl. chauvoei* and *Pasteurella* in animal carcases with a note on the rate of cooling carcases.**—*Indian J. vet. Sci.* **15.** 99–109. [Author's summary copied *verbatim.*] **2296**

In the case of *Pasteurella* and *Cl. chauvoei*, the organisms continue to multiply in the body for some hours after death. Some quantitative data to this effect are provided, based on cultural examination of tissues removed immediately after death and again after the carcase had been stored at air temperatures of 60–70°F. or above. The tissue mostly used was bone-marrow, since it can be easily manipulated. With blackquarter, the microscopical examination of such materials agrees with the cultural findings.

With blackquarter in sheep and guinea-pigs, at the time of death the organisms outside the lesion of inoculation are usually in the vegetative state. After some increase in numbers—of variable degree but sometimes 50- to 230-fold—they sporulate. If death is delayed, some may have already sporulated before death. The fresh local lesion contains enormous numbers of spores; a culture may develop from an amount estimated at 0·0000001 gm.

With acute pasteurellosis in rabbits the organisms continue to multiply in the bone-marrow during the first six hours, after which their numbers appear to remain stationary up to about 48 hours when they begin to decline. At the peak, the numbers may run to over 2,000 million per gm.

With anthrax, cultural results were erratic and there was no evidence that post-mortem multiplication is a constant feature.

Multiplication of pathogenic bacteria in the carcase is no doubt favoured by a warmer atmosphere, since body cooling will be retarded. Some data on the rate of cooling of carcases of different sizes are provided.

I. ALLISON, V. D., HOBBS, B. C., & MARTIN, P. H. (1949.) **A widespread outbreak of staphylococcal food poisoning.**—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* **8.** 38–47. [Authors' summary copied *verbatim.*] **2297**

II. HOBBS, B. C., & FREEMAN, V. (1949.) **Food poisoning due to pressed beef: bacteriological findings in four outbreaks.**—*Ibid.* 63–67. [Authors' summary copied *verbatim.*] **2298**

I. A widespread outbreak of staphylococcal food poisoning is described, comprising 441 reported cases occurring over a large part of eastern England.

The vehicle of infection was cooked sausage loaf, coated with a gelatin glaze, distributed by a large manufacturing firm.

Staphylococci of the same phage and serological types were isolated from samples of vomit and stool of victims of the outbreak and from 102 samples of the sausage meat recovered from shops and homes in different parts of the country. The staphylococci isolated from the sausage were present in large numbers in the gelatin glaze and absent from the meat.

Observation of the methods of manufacture of the gelatin glaze at the factory showed that a considerable amount of manual contact with the glaze occurred both during manufacture and in the process of glazing the sausage loaves.

Staphylococci of the same phage and serological types as were isolated from victims of the outbreak and from samples of the infected sausage were also isolated from hands or nose and hands of several operatives who had frequent manual contact with the glaze. The infection of the glaze was attributed to one worker, who manufactured the glaze and used his hands to mix the ingredients; this worker harboured the infecting strain of staphylococcus in his nose and on his hands.

The low temperatures to which the melted glaze was allowed to fall and the high atmospheric temperature prevailing at the time were considered to be factors contributing to the heavy infection of the food.

Recommendations were made to minimize the recurrence of dangerous infection of the food.

II. Four outbreaks of staphylococcal food poisoning were traced to the consumption of pressed beef from the same factory. The chef most closely concerned with the processing of the meat after pickling and cooking was found to be a nasal and hand carrier of the infecting type of staphylococcus, serological Type IIIc, phage Type 6/47.

The method of processing pressed beef is described and recommendations are made with a view to reducing the bacterial content of the finished product. These comprise sterilization of all equipment, manipulation of the cooked meat with implements rather than the hands, and rapid cooling of the meat blocks.

These measures were shown to reduce greatly the bacterial content of the meat but they cannot completely eliminate the risks associated with the sale of pressed beef, especially in warm weather. Many of these risks would be avoided by canning of the meat.

JONES, A. C., & SYMONS, A. D. (1948.) **An outbreak of food poisoning due to *Salmonella dublin* conveyed by sausages and sausage meat.** —*Minist. Hlth Publ. Hlth Lab. Serv.* **7.** (September.) 202–206. [Authors' summary copied *verbatim.*] **2299**

An outbreak of gastro-enteritis due to *Salm. dublin* is described. Sausages sold by two manufacturers were eaten by all notified cases. The two manufacturers had received a side from each of five bovine carcases issued by the local abattoir. The carcases had been passed as "fit for manufacturing purposes only". They were the carcases of casualties or of cattle of low grade. It is probable that one or more of these carcases was infected with *Salm. dublin* as a result of abattoir contamination from the faeces of an infected animal or a faecal carrier. Alternatively, one or more of the carcases may have been derived from an infected cow or a faecal carrier. Conditions of slaughter observed at the abattoir would allow contamination of carcases by organisms of faecal origin.

Uncooked sausages from various sources were examined for organisms of faecal origin. These organisms were present in 13 out of 14 sausages so examined. Laboratory examinations indicate that *Salm. dublin* may survive in a sausage after gentle frying for fifteen minutes. Measures for the prevention of this type of outbreak are discussed.

ANON. (1948.) **Meat and dairy hygiene school.** —*Bull. U.S. Army med. Dep.* **8.** 262–264. **2300**

The school is intended to train personnel for inspection of food supplies for the Army. Commissioned Veterinary Officers undergo a 12-week course, some 1,100 having qualified from 57 courses since 1940, and enlisted men a 16-week course, some 370 having qualified as technicians in 13 courses since 1945. Besides the regular staff, experts in every branch of the subject visit as "Guest Lecturers", as well as Veterinary Officers with experience overseas. Many of these lectures are recorded for subsequent repetition, both for their value and to instruct in methods of instruction. The school is well equipped with all modern facilities.—R. MACGREGOR.

See also absts. **2198** (Q fever in milk); **2349** (animal products as human food); **2350** (practical analysis and inspection of milk).

REPRODUCTION AND REPRODUCTIVE DISORDERS

GARM, O. (1946.) Det artifisielle inseminasjonsarbeide i Sverige. **[Artificial insemination in Sweden.]**—*Norsk VetTidsskr.* **58.** 281–299. [Abst. from English summary.] **2301**

G. reviews the organization of artificial insemination work in Sweden and describes the methods employed. The influence of artificial insemination on cattle breeding is discussed.

—E. G.

LAGERLÖF, N., & SÖDERGREN, L. O. (1948.) Den artificiella inseminationens mål, medel och framtida utveckling i Sverige. **[The aims and future development of artificial insemination in Sweden.]**—*Svensk VetTidskr.* **53.** 55–63 & 92–107. [Abst. from English summary.] **2302**

After reviewing the development of artificial insemination work in other countries, the authors report on its present position in Sweden. In the

beginning of 1946 about 46,000 animals were included, in the beginning of 1947 about 80,000, and in the beginning of 1948 about 110,000 animals. The work is organized in artificial insemination associations, *i.e.*, voluntary unions of farmers that wish to take part in the work and have their herds in places forming a suitable unit. The larger associations have a bull centre of their own, smaller associations often buy semen from the larger ones. Each association has one veterinarian or more to handle semen collection, examination and dilution and to take care of insemination, sexual health control, sterility treatments and pregnancy control of the herds. Artificial insemination work has made sexual health control in livestock very effective and in many places this is emphasized as its greatest advantage. For a long time Swedish farmers have been accustomed to having pregnancy examination and sterility treatments done by the veterinarian, so it seems advisable to have the insemination itself combined with sexual health control.

Because artificial insemination work has developed rapidly, veterinary staff have become insufficient. As assistants to the veterinarians young girls with good school education have been trained at the Veterinary College in Stockholm. These assistants do part of the artificial insemination work under the direction of the veterinarian. This arrangement works well. On June 1st, 1948, we may count on having 65 full-time veterinarians and 35 such girl assistants in artificial insemination work. The artificial insemination associations have, as a rule, good laboratories at the premises where the bulls are housed.

One hundred and two bulls were in use for artificial insemination on April 1st, 1947, of which 40 were Friesland, 59 Swedish red (SRB) and three beef breeds. The Friesland bulls usually served 1,080 cows and the SRB bulls 730. The average age of the Friesland bulls was 4·3 years, and of the SRB bulls 3·3 years. The average number of cows in the herds was 17·5. The percentage of pregnant animals was between 96·3 and 83. The percentage of fertility of the bulls varies to a considerable extent, but generally lies between 45 and 55. The number of inseminations per pregnant animal on an average seems to be about 1·6 in all associations.

There are great difficulties in producing suitable bulls, as sexual weakness is rather common among bulls in Sweden. Hitherto artificial insemination work has been done mainly with non-progeny tested bulls. Progeny testing of bulls to the largest possible extent is aimed at.

The authors are of the opinion that a slow development of artificial insemination work is advisable for the next few years. One would then get a chance to find out if the Swedish bulls have a sufficiently long period of activity to permit of the use of progeny tested bulls to a larger extent. Under good and well-informed direction and with careful development artificial insemination work is sure to benefit cattle breeding. If too rapid development is allowed without leading the work in the right direction one may fear increased inbreeding and spreading of, among other things, hereditary factors of sterility.

HOELZER, H. (1947.) Befruchtungsergebnisse durch Samenübertragung. **[Results by artificial insemination.]**—*Dtsch. tierärztl. Wschr.* **54.** 293–295. **2303**

In tests in Lindau 80·5% of cows became pregnant with an average of 1·4 inseminations per cow. The advantages of the use of artificial insemination are discussed.—M. LATZKE.

MERCIER, E., BRATTON, R. W., & SALISBURY, G. W. (1949.) **Semen production and fertility of dairy bulls as related to frequency of ejaculation.**—*Cornell Vet.* **39.** 32–38. **2304**

The authors' method of collecting semen from bulls was to take two ejaculations, a few minutes apart every ten or 12 days. Using the criteria of volume and concentration of semen, percentage and rate of motile spermatozoa, and methylene blue reduction time, two-thirds of the first ejaculates and one-third of the second ejaculates were discarded during 1947. In addition the fertility of each bull was determined from ejaculates used for insemination and was based on the percentage of first-service cows not returning for service within 60 days after the month of their insemination.

An experiment extending over 261 days was designed to find if the frequency of ejaculations employed was optimal. Three groups of four bulls each were used, each group including young, mature and old animals.

In the first group one ejaculate was taken at six-day intervals, in the second group two ejaculates were taken a few minutes apart at 12-day intervals and in the third group three ejaculates were taken a few minutes apart at 18-day intervals.

There was a decrease in the average semen volume as the interval period increased and with increase in the number of ejaculations taken at each collection. 45% more usable semen was obtained from bulls ejaculated at six-day intervals than from the other groups. The fertility of bulls ejaculated at 12-day intervals was higher than from bulls from the other groups (12-day interval = 68%; six-day interval = 61%; 18-day interval = 62%). The authors, however, feel that the differences represent unfortunate groupings of the bulls. The average fertility of ejaculations taken

at six-day intervals was close to that found in routine practice and so it was concluded that the shorter interval did not interfere with spermatogenesis.

Further experiments involving shorter periods between ejaculations would be necessary to find out the optimal interval.—JAS. G. O'SULLIVAN.

HERMAN, H. A., & HORTON, O. H. (1948.) **Spermatozoa behavior in bovine cervical mucus at varying stages of estrus.**—*J. Dairy Sci.* **31.** 679–680. [Abst. copied *verbatim.*] **2305**

To gain additional information on factors affecting the conception rate in dairy cattle, a study of the mucus secretions of the cervix and uterus has been undertaken. The viscosity and penetrability of mucus are factors in spermatozoa movement through the uterus and up the tubes. The consistency of mucus changes during the estrus period. In early heat it is thin and watery; as heat progresses it becomes more viscous and there is an infiltration of leucocytes.

The properties of cervical and vaginal mucus were studied with respect to flow-elasticity, penetrability of spermatozoa, volume, pH and leucocyte number. Vaginal temperatures also were recorded. The viscosity of cervical and vaginal mucus was found to be lowest during the first 6 hours of estrus and gradually increased as estrus was prolonged. Penetrability of the mucus by spermatozoa was highest during the first 6 to 10 hours of heat. The volume of mucus was greatest during the first part of the heat cycle. There was a rise in vaginal temperatures during estrus, the peak temperature generally occurring 14 to 16 hours after the beginning of the heat period. The mean of pH of mucus *in vivo* was found to be 7·28 during estrus and ranged from 7·25 to 7·39 during non-estrus.

The results in these preliminary studies indicate that the properties of bovine mucus may be of considerable interest in determining the most satisfactory practices to follow in obtaining a high conception rate where artificial insemination is used.

COLE, H. H. (1946.) **Estrogen in late pregnancy mare serum and ovarian inhibition.**—*Endocrinology.* **39.** 177–182. **2306**

Evidence has been obtained that the ovarian inhibition caused by late pregnancy mare's serum [P.M.S.] is due to the oestrogen present. In the first place, the pregnancy serum was found to have no antigonadotropic activity. For purposes of comparison the ovarian response to oestrogen was determined. In rats, 21–25 days old, the daily subcutaneous injection of one-quarter and one-half R.U. of α-oestradiol benzoate for 6–10 days produced ovarian inhibition as evidenced by vaginal smears and decreased ovarian weight (due to decrease in number of follicles 400μ or more in diameter), whereas one or more R.U. daily produced ovarian stimulation.

Thirty ml. of late P.M.S. injected over a three-day period produced ovarian inhibition. The administration of large doses of P.M.S. to rats was found to be impracticable. The oestrogenic extract prepared from the P.M.S. produced both inhibition and stimulation of the ovaries depending on the dose level. Five ml. of serum-equivalent produced inhibition compared to the 30 ml. of untreated pregnancy serum required. This increase in potency was the result of hydrolysis of inactive oestrogens.

The oestrogen inhibitory effect appears, from previous evidence, to be an indirect one *via* the pituitary, the stimulating effect being a direct action on the ovaries.—I. B. AINSWORTH.

MADDOCK, W. O., & HELLER, C. G. (1947.) **Gonadotrophic hormone. Protection against inactivation.**—*Endocrinology.* **41.** 177–186. **2307**

To the known gonadotropin enhancing mechanisms, augmentation and synergism, a third can be added-protection against inactivation. The first two are *in vivo* mechanisms, augmentation occurring at the site of injection, and being due to delayed absorption, whilst synergists act with the hormone on the gonads themselves. The third mechanism, protection against inactivation, is an *in vitro* mechanism.

Rat and sheep gonadotropins are completely inactivated by shaking at 37°C. for two and a half hours. Addition of whole blood, egg-white, testis slices, brain slices or $Al(OH)_3$ to rat pituitary gonadotropin offers protection against this inactivation whilst $Al(OH)_3$ prevents the inactivation of sheep pituitary gonadotropin. Whole blood prevents the inactivation of rat pituitary gonadotropin caused by storage at 3°C. for three days.

A scheme is put forward for the identification of the mechanism involved when an increase in potency is observed on addition of a given substance to a gonadotropic hormone solution. Protection against *in vitro* inactivation must be considered in all cases of augmentation. Some substances appear to act in both capacities as augmentors and protectors.—I. B. AINSWORTH.

RUBARTH, S. (1946.) Bidrag till den patologiska anatomin vid betäckningsimpotens hos tjur. **[Pathology of functional impotence in bulls.]** —*Skand. VetTidsskr.* **36.** 732–741. [Abst. from English summary.] **2308**

R. observed pathological changes of the peripheral parts of the pudic nerve in some cases of impotence in bulls.

Thickening of the perineurium, destruction

of the nerve fibres in limited areas and destruction of the myelin sheath were demonstrated. No changes in the central part of the nerve or significant changes in the testicles were observed. As a rule lymphocytic balanitis was found.—E. G.

DURRELL, W. B. (1949.) **Infectious vaginitis in cattle. A review with additional notes.**—*Canad. J. comp. Med.* **13.** 32–40. [French summary.] **2309**

A communicable infectious disease affecting cattle of all ages, transmitted by coitus, and manifested by small pyramid-shaped nodules studding the congested mucous membrane of the genitalia and frequently causing a muco-purulent discharge. [A more suitable descriptive term would be infectious vulvitis or nodular venereal disease.] The aetiology is unknown, as also the mechanism by which it interferes with conception. It is not readily amenable to treatment and no specific therapeutic agent is recognized. The economic aspect emphasizes the importance of preventive measures.—R. GWATKIN.

EASTOE, R. D., SUTTON, P. B., & MCDONALD, J. (1948.) **Observations on the breeding habits of Romney Marsh ewes. With special reference to hand service. Possibilities of once-daily matings.**—*Agric. Gaz. N.S.W.* **59.** 93–98. **2310**

Observations on the Romney Marsh flock at Hawkesbury Agricultural College revealed the following facts. One ewe in eight had an oestrous period lasting less than 24 hours. The mean duration of oestrus for 43 ewes in 1946 was 31 hours and 26 min.; for 49 ewes in April 1947, 31 hours and 54 min.; and for 49 ewes in May 1947, 32 hours and 5 min. The greatest proportion of ewes (64·1%) came into oestrus between 2 a.m. and 2 p.m., almost as many (62·4%) coming on between 6 a.m. and 6 p.m. There was little association between the time of day at which oestrus commenced in individual ewes in successive periods. Loss of condition or other upsetting factors could possibly shorten the period of oestrus.

In 68% of ewes in the 1947 observations there was a dioestral period of 16–17 days. In 10% and 22% there were periods of 14–16 and 17–18 days respectively. Examination of the upper part of the fallopian tube of six ewes, 24 hours after service, revealed appreciable numbers of spermatozoa of healthy appearance.

From a detailed examination of the data the authors considered that almost all ewes could be served by once-daily matings and that any hour would be satisfactory.

Little difference in conception rate (88% and 83%) was observed in two groups of ewes (26 and 23) mated twice daily (6 a.m. and 6 p.m.) and once daily (5 p.m.). The average gestation period of these ewes was found to be 147·9 days.—C. S. S.

MEGALE, F. (1947.) Contribuição ao estudo do bócio congênito nos bezerros, no estado de Minas Gerais. **[Congenital goitre in calves in the state of Minas Gerais.]**—*Rev. Ceres, Vicosa, Minas.* **7.** 40. **2311**

This report represents a systematic clinical investigation of first cases of congenital goitre observed in various localities of the state between 1940 and 1945.

All of the eight calves, three male and five female, were of Indo-Brazilian breed and their ages ranged from 5–8 days. The affection is quite common in districts where both pasture and water lack iodine. The disease did not affect adult animals, nor were there any abortions or premature births. The affected calves had general debility and stunted growth. Mortality was below 10%.

The disease could be controlled by feeding a balanced mineral supplement to the pregnant cow. Local treatment by weekly applications of tincture of iodine to the sub-laryngeal region was successful in all cases.

The report includes the systematic consideration of the aetiology, symptoms, course, morbid anatomy, prophylaxis and treatment of the disease, is profusely illustrated and accompanied by a table representing a detailed study of local iodine deficiencies as the causal factor in these cases.—G. P. MARSHALL.

HODGMAN, S. F. J., PARRY, H. B., RASBRIDGE, W. J., & STEEL, J. D. (1949.) **Progressive retinal atrophy in dogs. I. The disease in Irish setters (red).**—*Vet. Rec.* **61.** 185–189. **2312**

Describes the hereditary disease of defective vision due to progressive retinal atrophy, widespread in the Irish Red Setter breed of dogs. Some 30 affected animals were examined. Ophthalmoscopic examinations of 12 unaffected animals are described and contrasted with the progressive changes seen in the fundus of affected eyes. The genetics of the disease are discussed and diagnostic criteria suggested. Regulations made by the Irish Setter Association of England and the Kennel Club to control the disease are appended.—J. SCARNELL.

LABATUT, R., & DAUGREILH, G. (1946.) La maladie de la gestation chez le brebis. **[Pregnancy toxaemia in ewes.]**—*Rev. Med. vet. Lyon et Toulouse.* **97.** 241–243. **2313**

A small group of cases and the results of two P.M. examinations are described.—NESTA DEAN.

CONRADI, H. (1949.) Der Ovarialzyklus des Rindes und seine praktischen Folgerungen. **[Oestrous cycle in cattle.]**—*Mh. Vet.-med.* **4.** 10–14. **2314**

The physiology of the urogenital system, the oestrous cycle and formation of the corpus luteum are discussed, the palpability of which may serve as a guide for the recognition of a completed latent heat in cows. If the corpus luteum is expressed the ovulation cycle is shortened and the cow can be served again after 3–4 days.—E. G.

LUSH, J. L. (1946.) **Chance as a cause of changes in gene frequency within pure breeds of livestock.**—*Amer. Nat.* **80.** 318–342. [Abst. in *Exp. Sta. Rec.* **95.** 799. (1946), copied *verbatim.*] **2315**

Following a discussion of the influence of migration, mutation, and selection on the pure breeds of livestock, the author considers how chance can affect gene frequency, taking up variations in the number of offspring per parent, emphasis on one ancestor in selections, functional stratification of purebred herds, nonrandom mating, and the actual amount of random change in gene frequency.

It is concluded that chance deviations in gene frequency from one generation to the next, as a result of Mendelian sampling and the elimination of potential parents, are important in the pure breeds of livestock. Standard deviations of the order of 0·02 to 0·05 for gene frequencies near 0·5 seem to be about the usual magnitude of these chance changes in one generation. The major cause for these changes being so much larger than would be required automatically by the finite size of the population seems to be inequality in the number of gametes which the various potential parents actually contribute to the next generation. "Attention to family and pedigree, plus the economic incidents which happen to whole herds, probably emphasize this more in livestock than is usual in most species in nature, although this statement about purebred livestock as compared with wild species is an expression of faith which might be severely shaken if we knew more about the actual pedigrees of wild organisms."

See also absts. **2318** (effect of climate); **2340** (sex ratio).

ZOOTECHNY

PINZON, M. E. (1946.) Algunos problemas de aclimatacion. **[Problems of acclimatization.]** —*Rev. Med. vet., Bagotá.* **15.** 97–101. **2316**

Oxen, dogs, and poultry will usually become acclimatized readily, but not horses, donkeys, goats or camels. Cattle are best introduced to a new climate at the beginning of the second year, when they have passed the risks of calfhood and can still acquire premunity to tick-borne diseases. For transfer to hot climates, P. prefers cattle with black backs and white bellies, as these will be protected from the light and can radiate heat through the belly. A pendulous dewlap, navel and scrotum are also an advantage, as is a phlegmatic temperament. Even if taken to a high altitude, care must be used, as although the temperature is lower, the sun's rays are stronger and the humidity may be harmful. The utmost care is needed in maintaining good nutrition.

—R. MACGREGOR.

TEMPANY, H. A. (1949.) **The practice of soil conservation in the British Colonial Empire.**—*Tech. Comm. Com. Bur. Soil Sci.* No. 45. pp. 106. Harpenden, Herts; The Bureau. 10s. 6d. **2317**

Much of this booklet deals with methods of prevention of soil erosion by what one might describe as engineering methods such as construction of contour ridges, terraces, trenches, etc., but in addition much attention is devoted to cultural practices such as use of grass strips, rotational cropping, and wind belts. One of the eight chapters is devoted to control of grazing and livestock management. This chapter which discusses overstocking, grass burning, water supplies and erosion arising from the use of dipping tanks is of very direct interest to the veterinary officer. Systems of agriculture best suited to the avoidance of soil erosion are discussed and there is a chapter on legislation.

In the administration of soil erosion preventive measures, stress is laid on the need for co-ordination of the interests and activities of the various departments which are concerned. It is stated that lack of co-ordination has led to difficulties in the past, for example it is said that erosion from overstocking may have been aggravated in places as a result of successful disease control measures without simultaneous increase in fodder and water supplies. The setting up of separate soil conservation departments is not advised, central and district boards to co-ordinate activities are favoured.

This is a book which should be read by all veterinary officers in the Colonial territories and particularly by those in charge of cattle breeding farms and livestock improvement schemes.

—M. C.

ANDERSON, J. (1949.) **Climatic factors and reproduction in cattle.**—*The Veteran.* **1.** 96–100. **2318**

Investigations made at Naivasha in the Kenya Highlands over a period of years indicate marked seasonal variations in the periodicity and duration of oestrus in cows and in the sexual activity of bulls. High sexual activity is associated with a

high maximum temperature, a low minimum temperature, a large diurnal range of temperature and a high number of daily hours of sunshine. Thyroid therapy has been used with success to stimulate libido in bulls during the season of the year when sexual activity is depressed. Oestrus is short both in crossbred and zebu cows in Kenya and it has not been possible to lengthen its duration by injection of oestrogens.

It is suggested that cattle kept at high altitude may have some degree of hypothyroidism.—M. C.

SEATH, D. M., & MILLER, G. D. (1948.) **Effect of water sprinkling with and without air movement on cooling dairy cows.**—*J. Dairy Sci.* **31.** 361–366. **2319**

Although cattle lack true sweat glands they lose water by insensible perspiration. The amount so lost is variable and experiments were made to determine the importance of air movement, changes in air temperature plus the sprinkling of the body with water on the cooling of dairy cows.

The cattle used were six Jersey cows. Body temperatures were recorded after exposure to sunshine, in the shade, after sprinkling with water and after exposure to the breeze from a fan. The temperature and respiration rate rapidly returned to normal when the cows were sprinkled with water and exposed to the breeze from a fan. Shade alone produced little effect while the fan alone and sprinkling without a fan had intermediate effects.—M. C.

HORVATH, S. M., FOLK, G. E., CRAIG, F. N., & FLEISCHMANN, W. (1948.) **Survival time of various warm-blooded animals in extreme cold.** —*Science.* **107.** 171–172. **2320**

Observations were made on mice, canaries, rats, rabbits, fowls and pigeons exposed in a cold room, the temperature of which varied between –84° and –87°C. Adaptability to low temperatures varies considerably. Pigeons appear to be especially well adapted, one pigeon survived for 78 hours in a temperature of –85°C. The lowest temperature at which body temperature could be maintained for one hour was for pigeons –85°C.; fowls –50°C.; rabbits –45°C., and white rats –25°C.—M. C.

MARSH, T. D., & DAWSON, V. (1947.) **Animal husbandry in Malaya. 1. Cattle in Malaya.**—*Malay. agric. J.* **30.** 133–142; & 204–211. **2321**

MARSH, T. D., & DAWSON, V. (1948.) **Animal husbandry in Malaya. 2. The buffalo in Malaya. 3. The selection of breeding stock in general. 4. The improvement of cattle and buffaloes in Malaya.**—*Malay. agric. J.* **31.** 102–114; & 157–179. **2322**

1. An introductory paper to a series. This issue contains nothing new.

2, 3, & 4. The breeds imported from North and South India are first described, then small red zebu indigenous to the country, and finally the European stock which are still more or less experimental. Good descriptions are also given of the buffalo, both imported and indigenous. Acknowledgment is made to the Veterinary Dept. from whom most of the information was obtained. Only passing reference is made to goats, pigs and poultry, though these form the main meat supply of the Asiatic inhabitants.

The final article is apparently intended to instruct the principles of rationing and selective breeding, emphasis being rightly laid on the importance of selection from local stock rather than relying on imported sires, however good they may be. The prevention and control of disease is not mentioned.—R. MACGREGOR.

ROWSON, L. E., & DOWLING, D. F. (1949.) **An apparatus for the extraction of fertilised eggs from the living cow.**—*Vet. Rec.* **61.** 191. **2323**

The authors describe with the aid of a diagram a two-way rubber catheter for irrigation of the fallopian tube in a living cow, in order to collect fertilized ova. A latex collar at the middle of the catheter can be inflated with air and thus seal off a portion of the uterine horn, at the distal end of which is the fallopian tube. The injected fluid and the ova can be run off through a metal channel attached to the end of the catheter.—J. G. O'S.

TEUFFEL, S. (1947.) Die Haltung und Züchtung von weissen Mäusen für wissenschaftliche Untersuchungen. **[Keeping and breeding of white mice for scientific research.]**—*Berl. Münch. tierärztl. Wschr.* No. 8. pp. 85–88. **2324**

Hygienic and economical methods of maintaining and breeding white mice for scientific purposes are described.—E. G.

LALL, J. M. (1948.) **Prevention of cruelty to animals.**—*Indian Med. Gaz.* **83.** 314–318. **2325**

A general note on conventional lines, but referring to special conditions that occur in India. The religious reverence for cattle causes their preservation even when they become valueless owing to old age or other circumstances. But as the animals are, nevertheless, often allowed to starve and suffer neglect, humane slaughter should be provided in such cases. The "goshalas" and "pinjrapoles" (homes for old and useless animals) require improvement, as they do not conform to the ancient principles on which their management was based. Slaughterhouses are unsatisfactory. Certain practices also require to be suppressed, such as flaying live goats, castration by crushing the testicles with stones, "phuka",

the insufflation of air into the vagina to cause the "let down" of the milk, and malicious poisoning. The Society for the Prevention of Cruelty to Animals operates, but much more is required. The masses must be educated to the need for changing many old-established habits.—M. M. S.

See also absts. **2222** (grazing); **2301-2305** (artificial insemination).

TECHNIQUE AND APPARATUS

LUDLAM, G. B. (1949.) **A selective medium for the isolation of *Staph. aureus* from heavily contaminated material.**—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* **8.** 15–20. [Author's summary copied *verbatim.*] **2326**

A medium based on that of Chapman and his colleagues for the selective isolation of *Staph. aureus* is described. The medium, which contains mannitol, potassium tellurite and lithium chloride, produces large distinctive colonies of *Staph. aureus* and inhibits the growth of *Staph. albus*, enterococci, diphtheroid and coliform bacilli. It proved successful in the isolation of *Staph. aureus* from the nightdresses and skin of young infants, but further trials of the medium are desirable.

VAN CLEAVE, H. J., & ROSS, J. A. (1947.) **A method for reclaiming dried zoological specimens.**—*Science.* **105.** 318. **2327**

Specimens which have dried owing to evaporation of preservative can be reclaimed by immersion in a 0·25–0·5% aqueous solution of commercial trisodium phosphate, this being superior to caustic potash, which destroys tissues. Specimens ranging in size from plankton to large nematode worms were restored to their normal appearance by this method, without distortion of soft tissues or gross morphology. The process works satisfactorily at room temperature, but can be accelerated by raising the temperature up to 35°C.—E. PARKER POLLARD.

BROOKE, M. M., & DONALDSON, A. W. (1948.) **Transfer of malarial parasites between blood films during mass staining procedures.**—*Publ. Hlth Rep., Wash.* **63.** 991–1004. **2328**

Eight experiments are reported in which it was demonstrated that blood can become transferred from one slide to another during mass staining procedures, this being shown by the transfer of fowl corpuscles to smears of human blood stained in the same dish, and by the transfer of malarial parasites from slides of infected blood to those of normal blood. This transfer occurred most readily when the slides were arranged in packets with the smears facing each other, but it also occurred when the slides were so arranged that each packet contained only infected or normal blood. In seven experiments, utilizing human parasitized blood, the extent of transfer to normal thick films ranged from 7–94%.

The only visible loss of blood from positive films resulted from what was considered as flaking. Many factors probably contribute to flaking, for instance the cleanliness of the slide, the thickness of the film, and the length of drying time, but in these experiments the films were dried for 24–48 hours, were of the recommended thickness, and were believed to have been adequately cleaned.

As the loss of blood from thick films is apparently difficult to prevent, experiments were carried out to test the ability of technicians to recognize transferred parasites as contaminants, but no association of contaminating parasites with visible flakes could be demonstrated, and using 17 normal films which had become contaminated with malarial parasites during mass staining, in every instance a positive report was recorded by all of six technicians who examined them.

—U. F. RICHARDSON.

WEBER, A. (1942.) Recherches sur la fixation des tissus adultes ou embryonnaires en vue de l'imprégnation des éléments nerveux par les sels d'argent. **[Fixation of adult and embryonic tissues from the standpoint of impregnation of nerve elements by silver salts.]**—*Bull. Histol. Tech. micr.* **19.** 129–136. [Abst. in *Stain Technol.* **21.** 118. (1946), copied *verbatim.* Signed: JEAN E. CONN.] **2329**

The author has developed a method of fixation which makes possible excellent silver impregnation of even the finest nerve fibers. His procedure is to fix with formaldehyde in a slightly acid medium for several days. Then the tissues are washed in a mixture of dioxane and propyl alcohol to complete the extraction of lipids. After a rather rapid washing in distilled water, they are ready for impregnation by Bielschowsky's technic. He has succeeded in demonstrating nerve fibers in a variety of tissues including chicken embryos and the brains of fish and of adult rats.

HOOD, R. C. W. S., & NEILL, W. M. (1948.) **A modification of alizarin red S technic for demonstrating bone formation.**—*Stain Tech.* **23.** 209–218. [Authors' abstract copied *verbatim.*] **2330**

This paper shows that by using solutions heated in the incubator during certain stages, the alizarin red S method of staining the ossified centers in embryos has been shortened, with a consequent saving in time. New methods of mounting specimens have been evolved and are described in detail.

The technic of photographic mounted and unmounted specimens is outlined and illustrated by diagrams. Diagrammatic illustrations are provided of the various types of apparatus used, including a plan of the cabinet for demonstrating clearly the smaller embryos mounted between watch glasses. Photographic examples of the results achieved are also shown.

SEDRA, S. N. (1948.) **Making dry preparations of vertebrate material.**—*Stain Tech.* **23.** 205–207. [Author's abst. copied *verbatim.*] **2331**

A method is presented by which whole embryos, immature animals, parts of organs, or even thick sections, of vertebrate material are very slowly dehydrated, thoroughly cleared, and then dried to show the topography of complicated structures.

LASSEK, A. M. (1947.) **The stability of so-called axonal acid phosphatase as determined by experiments in its " stainability ".**—*Stain Tech.* **22.** 133–138. [Author's summary copied *verbatim.*] **2332**

Since the histochemical method for exhibiting acid phosphatase in bodily tissues is said to depend upon the enzyme acting on suitable substrates, it is possible to test its stability by various tests. It has been found that the background element or elements, whatever they may be, concerned with the " staining " properties of the reaction are very stable and somewhat resistant to destruction. So-called acid phosphatase in spinal cord axons has not been inactivated by subjecting it to various fixing solutions, changes in temperature and pH, relatively prolonged *post-mortem* autolysis nor by well known enzyme inactivators. It is believed that the " staining " reaction may be dependent fundamentally on other factors than enzymatic activity.

GORHAM, J. R. (1947.) **A helpful technic in making acid-fast stains.**—*Amer. J. clin. Path.* **17.** 915. **2333**

G. recommends the wrapping of the slide in filter paper for staining. Less stain is required, and the film is more uniformly stained.—A. M.-H.

DACANAY, J. G. (1949.) **A method for mass preparation of multiple histopathological slides.**—*Stain Tech.* **24.** 99–101. [Author's abst. copied *verbatim.*] **2334**

A method for the rapid preparation and staining of multiple mammalian tissues is described. With this method sections from 8–10 different organs can be handled simultaneously, mounted on the same slide, and stained with equally good differentiation and color contrast. It gives good results with either Zenker's or formalin-alcohol fixation.

ADAMS, T. W., THOMAS, R. W., & DAVENPORT, H. A. (1948.) **Staining sections of peripheral nerves for axis cylinders and for myelin sheaths.**—*Stain Tech.* **23.** 191–196. [Authors' abst. copied *verbatim.*] **2335**

Pieces of mammalian nerves 1 to 2 cm. long were placed under moderate tension and fixed 24–28 hours in: picric acid, saturated aqueous, 90 ml.; formalin, 10 ml.; and trichloracetic acid, 25% aqueous, 2 ml. They were washed in water, cut in two and one end stained with 0·04–0·06% osmic acid solution, while the other was dehydrated, embedded in paraffin, and mounted sections from it stained with protargol. The fixing solution used was selected from a number of combinations of acidified picroformalin as the one most likely to give satisfactory results when followed by both silver and osmic acid. The use of osmic acid solutions of less than 0·1% concentration avoided the overstaining of myelin sheaths seen frequently when stronger solutions were used with material that had been fixed previously. Protargol, 0·5% solution with fast green FCF added to make 0·05% dye in the final concentration, was used to impregnate sections for axis cylinders. Reduction and toning were done as in Bodian's method.

KING, E. J., WOOTTON, I. D. P., DONALDSON, R., SISSON, R. B., & MACFARLANE, R. G. (1948.) **Determination of haemoglobin. VI. Test of the M.R.C. grey-wedge photometer.**—*Lancet.* **255.** 971–974. [Authors' summary copied *verbatim.*] **2336**

Two examples of the commercially produced M.R.C. grey-wedge photometer have been tested for accuracy in haemoglobin estimations. In an experiment involving 240 separate estimates no estimate was more than 5 Haldane from the true value. The eight observers who went through the whole experiment showed no pronounced bias in favour of estimates higher or lower than the true value.

HERRERA, G., & PARDO, V. (1947.) **A new method for biopsy of the liver.**—*Arch. Path.* **44.** 393–395. [Authors' summary copied *verbatim.*] **2337**

A method of obtaining liver for biopsy [in man] is described which makes it possible to obtain a cylinder of tissue as long as the distance covered by the trocar in the liver and of the same thickness as the diameter of the trocar. A wire loop at the end of the trocar is an essential feature of the instrument.

The trauma is minimal; abundant tissue is obtained in every case.

LIEBOW, A. A., HALES, M. R., LINDSKOG, G. E.,

& BLOOMER, W. E. (1947.) **Plastic demonstrations of pulmonary pathology.**—*Bull. internat. Ass. med. Mus.* No. 27. 116–129. [Abst. in *Yale J. Biol. Med.* **20.** 425–426. (1948), copied *verbatim.* Signed: M. A. R.] **2338**

A method of producing plastic casts of lungs is described in detail. Pigmented suspensions of vinylite in acetone can be injected into the bronchial tree, the pulmonary arteries, veins, and bronchial arteries. After subsequent digestion of the tissue an anatomically accurate cast remains.

The applications of this method in the demonstration of pathological lesions, anatomy, and arterial anastomoses are discussed.

MISCELLANEOUS

MAKHIJANI, H. J. (1947.) **Cattle in India—problem of numbers.**—*Indian Fmg.* **8.** 365–372. **2339**

M. estimated the livestock requirements of India (before the partition) on the basis of (1944) needs and future requirements in respect of both bullock power and milk production. On the basis of existing performance, it was estimated that for cultivating a possible acreage of 441 million and allowing for an annual increase of 5 million human beings the requirements would be 60·4 million bullocks, 2·5 million breeding bulls, 23·6 million male calves (up to three years of age), 26·3 million breeding cows and 10 million calves (up to three years of age), *i.e.*, a total of 122·8 million head, as against the estimated total for 1937–38 of 186·2 million head of cattle. Ways for possible utilization of the surplus stock are suggested. After taking into consideration the optimum requirements for draft power, minimum essential milk supply, and the lowest possible surplus of calves which might be needed for export trade and for increasing cultivation the final requirements are given as follows, in millions: bullocks, 47·5; bulls, 2·5; working cows, 10·0; working and breeding cows (average annual milk yield per cow 1,000 lb.), 20·0; breeding cows (average annual milk yield per cow 2,000 lb.), 20·0; young male stock under three years of age, 20·0; young female stock under three years of age, 20·0; total 140 million.—S. S. PRABHU.

I. MACQUEEN, I. A. G. (1947.) **The sex-ratio at birth.**—*Med. Offr.* **78.** 149–150.

II. BENJAMIN, B. (1947.) **The sex-ratio at birth. [Correspondence.]**—*Ibid.* 186. [Abst. in *Bull. Hyg., Lond.* **23.** 85. (1948), copied *verbatim.* Signed: CHARLES WILCOX.] **2340**

I. MacQueen argues that the established indices of community health (infant mortality rate, stillbirth rate, etc.) are subject to occasional distortion, and that, although they must continue to be necessary, there is room for a new index. The sex-ratio at birth, he claims, is such an index, which is based on the fact that males are more fragile and more easily killed than females, but that more males are produced than females. Thus, in early abortions there are 120 males for 100 females, in stillbirths 110, at birth 105, at adolescence about equality, and in adult life a preponderance of females. Since males are more fragile, unfavourable conditions will tend to react more on unborn boys than on unborn girls, and Crew has shown that the sex-ratio is low (*e.g.*, 101 boys to 100 girls) at birth in conditions of poverty and ignorance. The ratio tends to be high (*e.g.*, 108 to 100) in good conditions. The ratio can therefore be used to measure social conditions.

The author argues that a figure of 104 boys born, or more, is about an average figure; 106 indicates good, and 103 poor, health services (including housing). In his own town (Mansfield) the male figures were 99 in 1945 and 107 in 1946, and he claims that these suggest that extensions and improvements made in the health services during 1945 were bearing fruit in 1946 [an assumption which the reviewer cannot accept on this evidence alone].

II. Benjamin questions the whole assumption, arguing (from examination of sex-ratios of 28 metropolitan boroughs) that this ratio has little correlation with the accepted social index of the percentage of males aged 14 and over in social groups IV and V at the 1931 census, and that the birth ratios fluctuate so greatly that they cannot be relied upon. He remarks that the Mansfield figure for 1942 was 102 males, and asks, pertinently, if this means that the health services deteriorated between 1942 and 1945.

REPORTS

AUSTRALIA. (1948.) **Twelfth annual report of the Australian Wool Board for the year 1947-48.** pp. 32. Items of veterinary interest, pp. 22–30. **2341**

The work of the Board on publicity and wool promotion is discussed in detail and is illustrated. There is a note on technical research.

The results of pastoral research are presented and cover investigations on pasture improvement and management, studies on sheep blowfly,

helminth parasites, genetics, nutrition, wool biology and several sheep diseases.

The insecticide benzene hexachloride applied as a dip containing 0·045% of the gamma isomer prevented body strike by the blowfly for about four weeks, but when applied as a spray (jetting) against crutch strike it was not as effective as the arsenical preparation usually employed. A dressing containing 10% of "semi-natural" oil of citronella from which geraniol had been extracted proved useful in preventing fly strike in lamb-marking wounds. Jetting with 0·75% benzene hexachloride also prevented strike in such wounds.

There is a marked seasonal fluctuation in the population density of the body louse (*Damalinia ovis*), numbers increasing in late winter and decreasing in spring and summer. Arsenic, rotenone, D.D.T. and benzene hexachloride were all toxic to the adult lice but none destroyed the eggs.

From studies on dipping it was found that the new insecticides, benzene hexachloride and D.D.T. lose concentration in dipping fluids by "stripping", which varies in degree according to the nature of the suspension or emulsion used. "Stripping" occurred more slowly from plunge dips than from power sprays, especially if the plunge dipping bath was large.

Studies on helminth parasites dealt with the "Self-cure" phenomenon, the action of phenothiazine, nutrition and HAEMONCHOSIS and the bionomics of the snail intermediate host of *Fasciola hepatica*.

The loss of infestation which constitutes "self-cure" has been reproduced under laboratory conditions by the administration of a large dose of infective larvae to a sheep already harbouring an infestation. The evidence suggests that the same sort of reaction may occur under field conditions after falls of rain which favour the development of infective larvae.

Against *Oesophagostomum columbianum* it was found that phenothiazine is just as effective when a low concentration is maintained in the vicinity of the worms by repeated small doses as when a high concentration is induced for a short period by a single large dose.

Phenothiazine in flake form was not as effective as the usual fine powder. Tablets compounded from the powder, provided they were not regurgitated before disintegration was complete, were not significantly less effective against *O. columbianum* than the powder.

In further trials with phenothiazine in salt lick it was found that it was capable of preventing serious losses from HAEMONCHOSIS, but the variations in intake of lick from sheep to sheep and time to time make the method unreliable. It is also more economical to use single large doses at strategic intervals.

A group of sheep on a high plane of nutrition threw off infestations with *Haemonchus contortus* in an average period of 19 days. On the lower plane 40% of the sheep threw off their infestations in an average period of 58 days, while 60% had no loss of infestation within 110 days.

Sheep maintained during the winter on a crop of oats or wimmera rye grass and turnips made very satisfactory weight gains and threw off their infestations with *O. columbianum*.

The condition "TOXAEMIC JAUNDICE", appears to be a complex, two components of which are copper poisoning and poisoning by the summer annual herb, *Heliotropium europaeum*. The pathogenesis of this unusual form of plant poisoning is briefly described. It is suspected that a number of plants, including *Erodium cygnorum* and *Trifolium subterraneum* may favour the development of a high "copper status" and COPPER POISONING in sheep in certain conditions. The importance of molybdenum in restricting the uptake and storage of copper in the liver was confirmed.

Other investigations of veterinary interest include vitamin D for sheep in southern latitudes, sheep and wool statistics, wool production and food intake, influence of non-nutritional factors (*e.g.*, atmospheric temperature) on wool growth, reactions of sheep to high temperatures and varying humidities, and breeding and grazing trials.

—H. McL. GORDON.

INDIA, ASSAM. (1945.) **Summary of the annual report of the Civil Veterinary Department, Assam, for the year 1944–45.** pp. 3. Assam Government Press. [1 anna or 1d.] **2342**

The staff consisted of the Director, one Veterinary Investigation Officer, one Assistant Investigation Officer (Poultry), four Veterinary Inspectors, 67 Veterinary Assistant Surgeons and 85 Veterinary Field Assistants.

1,427 specimens were examined, besides those done by the V.I.O. and A.V.I.O. (Poultry) in the provincial laboratory at Gauhati, of which 23 were for positive ANTHRAX, nine for HAEMORRHAGIC SEPTICAEMIA and 115 for SURRA.

The hospital and dispensary staff together with the itinerating staff did 37,630 castrations as against 37,529 in the previous year and the total number of cases treated amounted to 209,852 against 220,331 in the previous year. In all 398,352 vaccinations and inoculations were done during the year as against 278,299 in the previous year.

The two Investigation Officers did research work on a number of disease problems. The difficulty experienced in the control of contagious diseases, especially RINDERPEST, was due to want

of proper legislation and co-operation from the cultivators, which was mostly due to ignorance. The total expenditure of the Department for the year amounted to Rs. 232,911 against Rs. 222,038 in the previous year.—M. K. SREENIVASAN.

INDIA, BOMBAY. (1947.) **Annual Administration Report of the Civil Veterinary Department, Bombay Province, including the Bombay Veterinary College and the Bombay City and Harbour Veterinary Department for the year 1944-45.** [FARBROTHER, E. S., & DEEN, M. M.] pp. 56. Bombay: Govt. Central Press. 8vo. Annas 3 or 4d. **2343**

During the year the department was allotted the duty of administering the Bombay cattle, goats and sheep trade licensing order. The year opened with 63 students and of these 16 left after passing the final examination. In the hospital 8,704 animals were treated as against 6,512 in the previous year. Eighty-two animals were given antirabic treatment. In the laboratory 5,761 specimens were examined of which 1,745 were positive. Details of specimens examined and the results obtained are tabulated. One hundred and eighty-nine samples of rinderpest goat blood virus and 96 samples of goat spleen tissue virus manufactured at the Goat Virus Station were examined culturally for purity. Forty-four P.M. examinations were carried out, mostly on dogs. Interesting findings were: lesions of tuberculosis in the mediastinal glands, kidney and on the pleura of a bull terrier (the second case noticed in Bombay); and lesions of glanders on the skin, nasal-septum and in the lungs of horses.

388,390 doses of goat blood and 520,000 doses of goat spleen virus were produced from 1,192 goats against 500,570 doses of blood and 762,900 of spleen virus from 1,569 goats in the previous year.

4,508 outbreaks of contagious and infectious diseases were reported and attended to, a reduction of 1,223 as compared with the previous year. The total mortality was 31,372. Three cases of GLANDERS were detected in Bombay city. HAEMORRHAGIC SEPTICAEMIA was responsible for the death of 1,944 cattle and 3,534 buffaloes, and BLACKLEG for the death of 6,999 cattle and 699 buffaloes. Five hundred and ninety-seven sheep and 28 goats were said to have died of CONTAGIOUS PLEURO-PNEUMONIA in Poona division. SURRA both in equines and bovines was on the increase, there was a severe outbreak in bovines in one of the districts and as many as 315 cattle and 17 buffaloes died. Treatment in acute cases was unsuccessful. Deaths due to RINDERPEST were 13,070 as against 43,501 deaths due to RINDERPEST in the previous year. In 948 villages FOOT AND MOUTH DISEASE was confirmed with a mortality of 80 cattle and 15 buffaloes.

3,154 animals were protected against ANTHRAX, 1,970 with spore vaccine and the rest with serum. 80,145 animals were protected against HAEMORRHAGIC SEPTICAEMIA, 106,172 cattle and buffaloes were vaccinated against BLACKLEG and 254,254 animals were immunized against RINDERPEST in villages and 20,735 milch buffaloes in the Bombay city and suburban areas. Mortality, preventive inoculations, etc., have been tabulated.

In 133 hospitals and dispensaries that were working during the year 322,606 sick animals were treated and 44,751 animals castrated. The touring staff treated 97,556 cases and castrated 21,360 animals in the villages. 172,068 head of cattle were inspected for slaughter in the various slaughter houses and 11,321 animals were rejected as coming within the banned categories.

The expenditure on the department was Rs. 976,926/5/3.—M. K. SREENIVASAN.

BOOK REVIEWS

CLIFTON, C. E., RAFFEL, S., & BARKER, H. A. [Edited by]. (1948.) **Annual review of microbiology.** pp. 532. Stanford, California: Annual Reviews, Inc.; London: H. K. Lewis & Co., Ltd. Vol. II. $6.00. **2344**

This book is a timely reminder to medical and veterinary bacteriologists that they deal with only a small part of the subject. There are chapters on the yeasts, genetics of the fungi, bacteria as plant pathogens, the microbiology of soil, drinking water and sewage and biological nitrogen formation. Articles which are more familiar deal with bacterial metabolism and growth factors, the mode of action of chemotherapeutic agents and chemical disinfectants, the metabolism of malarial parasites, the spirochetes and neurotropic viruses and the pathogenic streptococci. Subjects which are not perhaps strictly microbiological include the inheritance of immunity in animals, complement and the nature of antibodies.

The various sections which are remarkably up to date cannot be reviewed here but should be consulted in the original by those interested.

—JOHN FRANCIS.

BENBROOK, E. A. [V.M.D.; Professor and Head of the Dept. of Veterinary Pathology, Iowa State College], & SLOSS, M. W. [B.Sc., D.V.M., M.S.; Assistant Professor of Veterinary Pathology, Iowa State College]. (1948.) **Veterinary**

clinical parasitology. pp. v + 187. Ames, Iowa: The Iowa State College Press. $4.50. **2345**

This book is divided into three sections, *viz.* (1) faecal examination in the diagnosis of parasitism; (2) skin examination for evidence of parasitic mites; and (3) the diagnosis of louse infestation. Textual matter is reduced to a minimum and the main value of the book depends on the use of photographs of the various specimens. In the section on faecal examination, for example, there are approximately nine pages of text and 84 pages of photographs. A useful feature in this section is that photographs of each specimen are given in two magnifications, ×100 and ×410.

The collection of faecal material, apparatus required, and the preparation of specimens for microscopical examination are concisely dealt with. Qualitative methods only are discussed. It is considered that quantitative methods would be out of place in a book on clinical parasitology, though references to quantitative methods are given in the appended bibliography. Sugar flotation is the method recommended for separating out oocysts and worm eggs, though it is admitted that this method will not recover the majority of fluke eggs. The section on faecal examination covers the commoner worm eggs and oocysts found in horses, cattle, sheep, goats, pigs, birds and man in the U.S.A.

Skin examination and the preparation of specimens is succinctly dealt with. Skin scrapings suspended in mineral oil are recommended for microscopic examination. The classification of mites and the characteristics of the various genera are given. In this section too most of the information is conveyed by photographs. There are gaps in the parasites dealt with: only psoroptic scab of the sheep is illustrated, though line drawings of the diagnostic characters of the three main groups of mites are included.

The section on lice is the least satisfactory in that many of the species mentioned in the text are not illustrated. This point instances a weakness in layout of the book. Where accurate diagnosis is dependent on comparison with a named photograph the value of the textbook will depend on the completeness of the range of photographs.

The section on faecal examination would have been improved by the addition of a classified host parasite list and some account of the characteristics of the various genera as in the section devoted to mites.

The photographs are of uniform excellence throughout, the paper and format pleasing and the binding is on the metal ring principle with perforated sheets, so that when open the book will lie flat on the bench.

There are 247 figures and the bibliography runs to 20 pages.—D. LUKE.

HUBBARD, C. A. [Formerly Head of the Department of Biology & Director of the Pre-Medic Curriculum Pacific University, Oregon]. (1947.) **Fleas of Western North America.** pp. ix+533. Ames, Iowa: The Iowa State College Press. $6.00. **2346**

This comprehensive work has very much to recommend it. It is written in a very easy and understandable style, furthermore, it includes many asides which will be of interest to those looking for information on fleas in general, rather than detailed taxonomy. Thus a short chapter is given on the students of Western American fleas in which biographical notes dealing with people like Baker, Jordan and Lord Rothschild are included. The medical importance of fleas in connexion with bubonic plague, pneumonic plague, typhus and tularaemia is dealt with in detail. The chapter on "Field and Laboratory Techniques" although short is of interest in that it describes the types of trap used, the methods of trapping and also the methods of laboratory preservation. The greater part of the work is of course devoted to systematics, but adequate attention is given to host lists and distribution maps are given for the species. The figures are clear although in some cases small and the characters utilized for identification clearly defined.

—J. B. CRAGG.

FREY-WYSSLING, A. [Professor of General Botany at the Federal Institute of Technology, Zurich]. [Translated by HERMANS, J. J., & HOLLANDER, M.] (1948.) **Submicroscopic morphology of protoplasm and its derivatives.** pp. viii + 255. New York; Amsterdam, London, Brussels: Elsevier Publishing Co. Inc. 32s. 6d. **2347**

The morphologist has always been striving to view smaller and smaller structures, but it is only in recent years that the introduction of the electron microscope has made the submicroscopic directly visible. Indirect methods such as X-ray analyses or polarization methods have, however, in many cases made it possible accurately to determine the morphological structure of many organic molecules and the author points out that these indirect methods are still of the greatest value, electron microscopy in no way replacing them.

The book is divided into three parts. The first describes the methods of morphology, the second the structure of protoplasm and the third the structure of protoplasmic derivatives. Although much remains hidden, it is clear that life without structure is impossible and that the structure of living protoplasm cannot arise spontaneously from unformed solutions; so that to the

biologist submicroscopic cytology assumes a place of great importance. Indeed, without a knowledge of structure, the proper understanding of metabolic processes is impossible.

The reader will find in this book a clear account of the present state of knowledge of submicroscopic morphology and the fascinating structures upon which life is built.—J. A. N.

NORTHROP, J. H., KUNITZ, M., & HERRIOTT, R. M. (1948.) **Crystalline enzymes.** pp. xxi + 352. New York: Columbia University Press; London: Geoffrey Cumberlege. 2nd Edit. Revised and enlarged. 42s. ($7.50.) **2348**

The second edition of this monograph maintains the high standard of its predecessor and contains much valuable new material. Since this book first appeared in 1939, the number of enzymes isolated and crystallized in a reasonably pure state has been more than doubled.

This monograph, apart from the first chapter, is not a general account of crystalline enzymology, but deals with the authors' work at the Rockefeller Institute for Medical Research. However, the introductory chapter gives a clear concise account of enzyme catalysis and kinetics.

The main part deals with the isolation and properties of the proteolytic enzymes. There are also sections on ribonuclease and hexokinase, viruses, bacteriophage and diphtheria antitoxin. Assuming the protein nature of viruses there is an interesting polemic on the synthesis of proteins and virus formation, although the results are not conclusive. The reaction kinetics of each enzyme are clearly dealt with, elucidation being aided by numerous graphs and tables.

The general text is kept free from methods of enzyme preparation which are to be found in a most useful appendix, leading however to some repetition, from which the rest of the book is not entirely free. There are a well selected bibliography and some beautiful photomicrographs of the crystalline preparations.—MARCUS S. BROOKE.

JEAN-BLAIN, M. (1948.) Les aliments d'origine animale destinés à l'homme. **[Animal products as human food.]** pp. 573. Paris: Vigot Frères. **2349**

A survey of the meat industry in France that may well prove to be a useful book of reference elsewhere. The first chapter, dealing with the origin, marketing and slaughter of meat animals, is all too short, but the succeeding sections which deal with the chemistry and bacteriology of meat, both as a whole and when divided into separate joints, gives much detailed information. Extensive tables of the nutrient and other constituents, a good index and a long bibliography add to the value of this part; but many of the diagrams illustrating the cutting of carcasses into butcher's joints are somewhat elaborate. The sections on the preservation of meat by cold storage, salting, smoking and drying do not, perhaps, contain much new material, but make interesting reading and may be handy for reference: similar comment may be made on the section dealing with milk and milk products; there is a long and interesting chapter on cheeses, their manufacture and storage. The French palate is more interested in a variety of flavours than is ours, and this is shown in the chapter on cooking, in which more emphasis is laid on adding new flavours than on preserving the original character. The section devoted to game deals not only with wild pig and deer, but bear, squirrel and even fox. The ordinary game birds are dealt with, as well as larks, thrushes and blackbirds, but the author wisely draws the line at starlings. Whale, porpoise and turtle receive a brief mention.

—R. MACGREGOR.

THIEULIN, G., & VUILLAUME, R. (Undated.) Éléments pratiques d'analyse et d'inspection du lait. **[Practical analysis and inspection of milk.]** pp. 248. Paris: Le Lait "de Ch. Porcher". 2nd Edit. Fr. 100. **2350**

To the dairy laboratory worker, whether physicist, bacteriologist, chemist or biochemist, this work must prove of inestimable value. While of course it is written chiefly for French workers and contains much of the milk legislation pertaining to France, the bulk of its contents will be of use in all countries where modern methods of milk examination are practised.

The book was first published in 1942 and this edition brings it up to 1947. The subject-matter is arranged in three parts. The first deals with the different types of milk submitted for analysis; divided into (a) Normal Milk, (b) Abnormal Milk such as colostrum, "retained milk" from cows which have been "over-stocked" and milk from cows with mastitis; (c) Altered Milk, milk so changed as to render it unfit for general use owing to an alteration in colour, taste, or constituents, adulterated milk and milk containing pathogenic organisms and (d) Modified Milk, such as skimmed milk, pasteurized milk, sterilized milk, condensed milk and so on.

The second part deals clearly and systematically with the methods of examination in general use, physical, chemical, biochemical, bacteriological and serological and includes methods for testing the water used for washing and rinsing dairy utensils. In this section the various tests are treated as far as possible in a uniform manner, commencing with the reagents used, followed by the principles involved for each test, a description of the technique, the interpretation of results and any special remarks called for.

The third portion deals with the inspection of mixed and individual milk samples and includes investigations into infected milk such as tuberculous and brucella-infected milk and samples of milk containing salmonella and other pathogens. In dealing with the biological test for tuberculosis one is rather surprised to read the following on the results of g. pig inoculation: "If the inoculation is positive in one of the guinea-pigs inoculated, the milk will be considered as tuberculous. If the inoculation is negative for both guinea-pigs inoculated, the case will remain *doubtful, with a strong presumption of absence of infection*". Although this may be strictly true it seems to go further than the orthodox interpretation of a negative biological test.

Two useful appendixes are included; the first, thoroughly practical, gives a detailed list of the requirements for the equipment of a laboratory and the second summarizes the milk legislation as applied to France up to 1946, including some local municipal regulations appertaining to Paris.

The work ends with a list of contents and also an alphabetical index. There are five full-sized plates, one of them coloured, and numerous diagrams. This book can be recommended to all interested in the laboratory side of milk inspection.—D. S. RABAGLIATI.

BOOKS RECENTLY RECEIVED

[Notice of recently received books in this list does not preclude review.]

BENOIT, R. (1948.) Le lapin: élevage—races—maladies. **[The rabbit.]** pp. 202. Lausanne: Librairie Payot.

BOUVIER, G., & GASCHEN, H. (1949.) Guide d'entomologie médicale et vétérinaire. **[Guide to medical and veterinary entomology.]** pp. 96. Lausanne: Librairie Payot. Sw. Fr. 5.

CONANT, N. F., MARTIN, D. S., SMITH, D. T., BAKER, R. D., & CALLAWAY, J. L. (1944.) **Manual of clinical mycology.** pp. xiii + 348. Philadelphia & London: W. B. Saunders Company. 22s. 6d.

DOWLING, H. F. (1948.) **The acute bacterial diseases: their diagnosis and treatment.** pp. ix + 465. Philadelphia & London: W. B. Saunders Company. 32s. 6d.

DYRENDAHL, S. (1949.) **Some effects of feeding iodinated casein for a long time to cattle, swine and white rats.** pp. 116. Stockholm: The Author. [In English.]

GALLINA, L. (1948.) Le placentiti o la ritenzione della placenta nella vacca. **[Placentitis or retention of the placenta in cows.]** pp. 74. Milano-Varese: Istituto Editoriale Cisalpino. Lire 400.

GARDNER, W. (1948.) **Chemical synonyms and trade names. A dictionary and commercial handbook.** pp. 558. London: The Technical Press Ltd. 5th Edit. 50s.

GASTINEL, P. (1949.) Précis de bactériologie médicale. **[Précis of medical bacteriology.]** pp. xv + 1040. Paris: Masson et Cie. Fr. 2800.

GEROSA, G., & MIRRI, A. La sterilità degli animali domestici. **[Sterility in domestic animals.]** pp. xii + 320. Milano-Varese: Istituto Editoriale Cisalpino. 2nd revised Edit. Lire 1.500.

GEURDEN, L. (1949.) Ziekten en Gebreken in het Pluimveebedrijf. **[Diseases of fowls.]** pp. 121. Antwerp: N. V. Standaard-Boekhandel. Fr. 55.

GEURDEN, L. (1946.) De Ziekten der Volierevogels. **[Diseases of cage birds.]** pp. 32. Antwerp: N. V. Standaard-Boekhandel. Fr.25.

GEURDEN, L. (1946.) Plagen op het Duivenhok. **[Diseases of pigeons.]** pp. 59. Antwerp: N. V. Standaard-Boekhandel. Fr. 29.

GÖTZE, R. (1949.) Besamung und Unfruchtbarkeit der Haussäugetiere. **[Insemination and sterility of domestic animals.]** pp. xii + 613. Hanover: M. & H. Schaper. DM. 58.

HEDSTRÖM, H. (1949.) Studier: over s.k. hudtuberkulos hos nötkreatur avseende sjukdomens utbredning i Sverige, dess diagnostik, etiologi och allergi för tuberculin. **[So-called skin tuberculosis in cattle.]** pp. 192. Stockholm: Gernandts Boktryckeri.

HESS, W. R. (1948.) Die funktionelle Organisation des vegetativen Nervensystems. **[The functional organization of the autonomic nervous system.]** pp. 226. Basel: Benno Schwabe & Co. Sw. Fr. 18.50.

LAGERLÖF, N. (1948.) Husdjurens vanligaste sjukdomar. **[Common diseases of livestock.]** pp. 295. Stockholm: Nordisk Rotogravyr. Kr. 4.75.

LANGERON, M. (1949.) Précis de microscopie. Technique — expérimentation — diagnostic. **[Précis on microscopy.]** pp. viii + 1480. Paris: Masson et Cie. 7th Edit. Fr. 2600.

OCKENDEN, F. E. J. (1947.) **Illuminants and illumination for microscopical work.** pp. 26. London: Williams & Norgate Ltd. 2s. 6d.

WILLEMS, A. E. R. (1949.) Signalement van het Paard. **[Identification of horses.]** pp. 79. Antwerp: N. V. Standaard-Boekhandel.

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